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THE UNIVERSITY OF ALBERTA

INTERACTIVE LASER VIDEODISC TECHNOLOGY APPLIED TO SPORT

AUDREY ELAINE BAKEWELL

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE DEGREE

OF MASTER OF ARTS

DEPARTMENT OF PHYSICAL EDUCATION AND SPORTS STUDIES

EDMONTON, ALBERTA

FALL, 1986

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled INTERACTIVE LASER VIDEODISC TECHNOLOGY APPLIED TO SPORT submitted by AUDREY ELAINE BAKEWELL in partial fulfilment of the requirements for the degree of MASTER OF ARTS in PHYSICAL EDUCATION.

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Date: May 27, 1986

ABSTRACT

This study demonstrates the application of laser videodisc technology to sport through interaction of an IBM PC/XT and a SONY LDP-2000 videodisc player.

The features and capabilities of the technology are explored in detail. These capabilities include the following features: customized instruction; variety of presentation through text, graphics and video; branching; immediate access to video sequences or frames; immediate feedback and remedial information following domain tests; and a built-in student evaluation system.

The Beginner Running course is a demonstration course designed to feature the capabilities of the technology. This course consists of three domains. The first domain, Starting Out, has four modules. The first module offers information on the proper running posture. The second module provides the beginner with a schedule for running. The third module discusses solutions to boredom, which may occur while running. The fourth module suggests ways to become a better runner. At the end of the domain a test must be passed before advancing to the next domain.

The second domain has only one module on Injuries. Due to limited disk space, this section on foot, leg and knee injuries was not divided into three modules, thus the student receives simultaneous information. A domain test

must be passed in order for the student to proceed to the third domain.

The third domain consists of a final exam through which part of the student's mark is determined in the overall activity course.

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CHAPTER I

GENERAL INTRODUCTION TO THE STUDY

Technology in recent years has done much to enhance the teaching of sport. From the use of Nisus stop-action video and videotex graphics during Hockey Night in Canada broadcasts to the use of a microcomputer as a data base for results by the track coach at a local high school a large number of mediums are now available to increase knowledge in sport.

However, in most cases, use of the new technologies has been limited to those who take the time to design, develop, program and revise their product to suit their own needs. Otherwise the technologies have been used, but not to their fullest capabilities. A videotape of a gymnast doing a routine on the balance beam may be used during a physical education class. Typically the instructor uses the tape as an example of specific techniques properly performed. This is shown to the class as a whole, then the class is dispersed to attempt the skill. Errors are encountered during practice and, depending on the availability of the instructor, they may or may not be corrected. There is little time in a class situation for individualization, questioning or making sure each student has grasped the main concepts of the skills that particular day.

This problem is not just limited to the school system, but to any area of sport involving group instruction. Even in an individualized sport like figure skating the skater needs more information than can be provided one-on-one during a few fifteen minute lessons per week. Most of a skater's lesson is spent performing a specific technique and then receiving feedback regarding that particular skill. This is common to many practices in sport. The coach may limit the practice to a certain strategy. There may be several factors that affect that particular strategy, but due to time constraints,the coach focusses on the main factors that will produce the successful play. Certainly using traditional methods the players are receiving important instruction, but using new technologies could receive, perhaps, unlimited amounts of information.

The advent of the laser videodisc will revolutionize teaching techniques. Sport skills are generally taught in step-by-step progression. The laser videodisc allows each part of each skill to be shown and, thereby, taught frame by frame. The videodisc can show, frame by frame, the particular position of, for example, an ankle in a skill. Only the videodisc has this capacity. Even the videotape cannot provide the freeze frame with the clarity necessary to teach the technique. For example, in attempting to teach the same ankle position with a freeze frame on

videotape, there will be a shimmering effect in the picture from the knee down. Thus studying the ankle position is very difficult. Moreover, the videodisc can hold a freeze frame position for an unlimited time, whereas a videotape can only hold the pause for approximately two minutes before causing a "burn-out" effect on the tape.

When the videodisc is combined with a microcomputer full branching, simulation, testing and student management are possible. Cox and Sawchuk in A Literature Review on Computer Based Multimedia Training describe interaction as the amount of control the user is able to execute over the information being presented to him. They further describe the levels of interactivity (when using videodisc) as ranging from 0 through 4, with each level offering enhanced interaction over the previous level. At level zero, material is simply presented as linear motion with 30 or 60 minutes playing time per side. Level one interaction normally consists of a mixture of still and motion sequences. At level one, the user can freeze frames, forward and reverse play, scan, fast play, slow motion and step motion sequences. Level two uses the memory capabilities of the industrial/educational videodisc player. By following a program, the videodisc player can give the user a series of choices which will then control what the user will see next. The memory in the

videodisc player is limited and, therefore, the length of the program is restricted. At Level three, one or more videodisc players are connected to an external microcomputer. If two video screens are used, the material from the videodisc is presented on one screen and the information from the computer is presented on the other. This use is particularly valuable when video segments or stills need lengthy explanations. The computer also permits retention of detailed information regarding the path the user has taken through the material, as well as his/her input at various decision points. A system with level four interactive capabilities consists of a videodisc that is part of a larger information retrieval system. Large banks of discs, players and computers are connected to a central location, in an integrated manner. The logistics of this are similar to building a large data processing application.(1)

An example of a level zero videodisc would be a home entertainment movie. The James Fixx on Running disc is a level one videodisc; it is a linear program broken into sections like Chapters in a book. This videodisc has no branching capabilities.

Parsloe, author of Interactive Video, views branching as the feature which makes video interactive. An interactive course moves from the trunk of the main course off onto branches bearing special scenes and segments. This

extra material is usually composed of variations on the central theme, prepared to meet the needs of users with special interests or problems.

Branching occurs from a decision point such as a 'menu' with a choice of what to view next, or a test of some kind. From such a decision point, the course is prepared to branch to any one of a given number of segments, along paths laid down when the program was designed. It is the user's choice at the decision point which determines, implicitly or explicitly, which of those paths will be taken.

The user can make a straight forward decision. However, the user can also make a decision without knowing what will follow next, in answering a test question, for instance, or making a decision in a simulation exercise. The user who gives a correct answer can move straight onto the next segment in the lesson; the one who gives a wrong answer can either be taken through the relevant material again, or shown a remedial segment which approaches the material in a different way. Commonly, one branch leads to another and they all weave back and forth around the main trunk of the course, which contains material common to them all.(2)

Level two videodiscs have branching capabilities which are pre-programmed onto the disc. An instructor, therefore, has no control over what the users specifical-

ly see other than perhaps a list of segments. The level three combination of the laser videodisc and the microcomputer is the best choice for the instructor interested in individualizing information. The instructor can customize existing materials or can design new materials. By using the microcomputer, the same material can be regimented into many new courses. All it takes is the imagination of the instructor and perhaps an authoring system. Few instructors are computer programmers. In the past this has been the main obstacle in software development. An authoring system permits the instructor to input the course logic using everyday language. The system then translates the input into a computer language such as BASIC, Pascal or, more recently, C language.

In choosing an authoring system the instructor must ensure it is appropriate for the course design structure and style of presentation. The instructor should also consider the type of student management the system offers in terms of user evaluation, record security and question analysis. This built-in data gathering option allows the instructor to not only evaluate the user, but also the course.

By offering the user interactivity with the course, the instructor is offering the opportunity for users to expand their knowledge, have questions answered and errors

avoided or corrected through procedural presentation, remediation and simulation.

Many of the existing materials in sport lend themselves directly to adaptation to level three interactivity. Films, videotape, slides and photographs can be transferred to videodisc. Customized instruction, records, dynamic data, athlete biographies, etc. can be stored on floppy discs and programmed or up-dated as required. The instructor may not only design customized courses, but also generic courses. These generic courses are important in providing knowledge about skill technique for the average teacher or coach. Such courses could apply to:

1. Volunteer coaches, who end up coaching due to a 'lack of a coach'; more than as a result of 'wanting to coach' or having 'expertise' to offer. Many have a general background of hockey, for example, but do not have specific skill expertise of a mohawk turn or a drag shot.

2. Because most coaches do coach in their spare time, they have little 'extra' time to prepare for their coaching. Reading numerous books on technical skills is time consuming and not as effective as seeing those skills performed.

3. Although the coach may read about skill technique, he or she may not be able to perform that skill. An incorrect demonstration is worse than no demonstration.

4. Due to distance factors, coaches in remote areas find it difficult to attend coaching clinics which tend to be in centralized areas.

5. Sports are offered as part of the physical education curriculum in most schools. Preparation for this at the university course level is limited. The student looking for further information may turn to the teacher or coach only to find, again, a limited resource.

The above are reasons why there is a need to develop not only software programs, but the technology offering the best use of these programs. A level three work station would include a microcomputer, a laser videodisc player, a videotex (for graphics and text development), and preferably two monitors. This type of work station could be set up in schools, libraries, community halls or even shopping malls. The user would only require the videodisc and floppy disk.

The present study was designed to develop a level three interactive course using existing materials. One reason for choosing this level was to use it as a prototype for future course development.

CHAPTER II

GENERAL DISCUSSION

The Problem

Objectives of the Study

The objectives of this study were (1) to develop a level three interactive course on running and (2) to develop a series of logical steps which instructors must follow in future course development.

Definitions of Terms Used

Several key terms have specific meanings in the following text. They are:

COURSE - a complete package of information which, when used in conjunction with a microcomputer and videodisc, offers customized instruction.

USER - refers to the student using the course.

INSTRUCTOR - refers to the person preparing and presenting the course.

A complete glossary of terms is included in Appendix A.

Limitations of the Study

A basic aim of the study was the development of a course which would be sufficiently sophisticated to meet

the precise needs of beginner runners, yet presented in such a manner as to encourage the use of the technology in other sports. Although this course is directed to beginners, it is hoped that this limitation will serve to stimulate the development of more specialized courses in other sports and specifically to meet the needs of the advanced runner. For example, a course devoted to marathon running could be developed.

The design structure of this present course was limited by the use of an authoring language. For example, in the area of student testing, four types of questions were offered: true/false; multiple choice; fill-in-the-blank and short answer. This system does not allow for answers in essay, scale, ranking, or matching form nor for more than one answer in fill-in-the-blank questions. Carey and Dick suggest the probability of guessing the correct answer is a factor that should be considered when writing test items. Some response methods enable users to guess the correct answer more so than others. True/false questions provide users with a 50-50 chance of guessing the right answer, while multiple choice questions with three, four, or more responses also give them the opportunity to guess the right answer though the odds of doing so are not as high. It is more difficult to guess the correct answer in a long line of ten or more matching items than it is to select the correct answer from among

three or four. It is also more difficult to guess the correct answer to a fill-in-the-blank question than it is to select the correct term from among two to four choices.(3)

Another limitation in using an authoring system is that it is presently only compatible with certain computing systems. COURSEWRITER is compatible with the IBM Personal Computer - Models PC and PC/XT. However, as this language is currently being rewritten in 'C' version, COURSEWRITER will be applicable to all computer systems.

The course developed for this thesis was designed for Level three interactivity. This level of interactivity requires a laser videodisc player, a microcomputer, a videotex capability and preferably two monitors. This amount of equipment limits the use of such a course to educational institutions which have the finances and facilities to house such a work station.

The videodisc used in this particular study was a commercial level one disc. Its use, in this case, although convenient, does limit the author of the course to video scenes and information provided by another author (James Fixx). The course author may use computer text and graphics to supplement the video scenes, but cannot create new video scenes as may be required in remediation. As Floyd and Floyd point out, all the "retrofitting" in the

world will not yield a course as effective as the one designed from scratch.(4)

One technical limitation of the videodisc is that once produced it cannot be altered. It is not as yet re-recordable like videotape.

CHAPTER III

HISTORICAL DEVELOPMENTS

Interactivity

Whether or not a course is interactive is determined by the user. If the user takes an active part by making decisions which affect the path of the course, then it is considered interactive. Interactivity is not a new concept.

Floyd and Floyd summarized the development of early interactivity as follows. The first teaching machine is generally ~~re~~credited to Sidney Pressey, a professor at Ohio State University. During the early 1920's, Pressey built a teaching apparatus that resembled a simplified typewriter. A multiple choice question was presented to the student in a window box. If the student pressed the key corresponding to the correct answer, the next question was rotated into view. However, if the student pressed the wrong key, the machine recorded the incorrect answer and the student had to try again.(5)

The next significant development occurred years later in the 1950's when Skinner and his group were credited with originating programmed instruction. The teaching machines they developed presented discrete units of information followed by fill-in-the-blank questions. Later, Dr. Norman Crowder combined Skinner's and Pressey's

work to create branched programmed tests. He designed multiple choice questions so that each answer routed the respondent to a different path.

Today many of us take computer assisted instruction for granted. However, it was just over thirty years ago CAI was developed. Three IBM researchers, William Uttal, Nancy Anderson and Gustave Rath linked an IBM 650 computer to an electronic typewriter, so that elementary students could use the keyboard to learn math.(6)

The CAI experiments in the 1960's and 1970's led to the current merger between video and the microcomputer. In 1977 McGraw-Hill funded an interactive videodisc on biology developed by WICAT, Inc. (World Institute for Computer Assisted Teaching). This videodisc project is generally recognized as the first interactive disc developed for individualized learning.(7)

Individualized learning is the basis for interactivity. Interactivity occurs when a program is put in tandem with a computer and the user controls both to select, sequence and pace the program. Bork states learning is best achieved when the student plays an active role in the process and that different individuals learn in different ways along a variety of dimensions.(8) Thus, interactivity would appear the method to use in teaching. Particularly when dealing with a large class, the teacher could use the videodisc in a number of ways.

Merrill suggests the videodisc be used by a teacher: to enhance a classroom presentation; in a learning resource center for individualized instruction; in the library for self teaching; in the audiovisual center for closed-circuit broadcasts to the classroom; in the laboratory to demonstrate the use of equipment; in the factory for on-the-job training; in the shop as a job aid; in the home as part of a continuing education course or for self-instruction.(9)

Because two audio channels are accessible on a videodisc, the instructor may develop a course with two levels of instruction. One channel could be used for advanced instruction while the other channel might be used for step by step instruction aimed at slow learners. A pre-test is used at the beginning of the course to determine the user's level of entry into the system. From that point on the lesson is specifically geared to that user. Students who are well versed in the topic can easily move ahead to challenging new information. Thus, this student is not bored receiving information with which he or she is already familiar. The slower student, on the other hand, can progress at the appropriate pace. This latter student has several options available through interactivity to ensure a complete grasp of a subject. Through menus the student can select: extra information on a subject prior to a test; review the material just presented, again,

before the test; sign off and return to the course another day. During a test if the incorrect answer is chosen the relevant material is automatically reviewed or new material is presented on the same topic. The sign off option allows the student the opportunity to seek further information on the subject (from the teacher or the library, for example).

Another important feature of interactivity is that the learner receives immediate feedback on the subject and the interaction with it. Floyd (1986) points out that in acquiring a new skill, learners generally need more frequent, more specific feedback than later in the learning curve.(10) This theory is easily accommodated in an interactive course where tests can be embedded or placed anywhere in the material.

The levels of interactivity were discussed earlier. This study was designed to demonstrate the capabilities of level three interactivity. The microcomputer was used to program a level one videodisc to interact with a course stored on a floppy disk.

The Laser Videodisc

While the laser videodisc is a very recent development, the concept of placing audio-visual material on disc is not new. In fact, the first patent for a videodisc was filed in London on October 15, 1926 and was for a system

called Phonovision. The authors of the patent were Television LTO and the pioneer of television, John Logic Baird.

The Phonovision disc system was very simple, consisting of a 12-inch (30 cm) shellac disc, the grooves of which were modulated not by sound, but by the 13 KHz bandwidth television pictures. The sound was recorded in a separate groove to the vision and was retrieved by a separate pick-up. The stylus assembly had two points, one for sound and one for vision.(11)

Interest in videodiscs waned in the early 1930's when the BBC took over Baird's television transmissions and focussed their attentions on the electronic television system. However, in the mid 1950's it was the electronic television that renewed interest in the videodisc. Two different and somewhat opposing stimuli drove engineers back to videodiscs: the need for broadcasters to have some type of instant replay, slow motion device and the vast untapped consumer market, to which the idea of 'video records' could be made to seem attractive.(12) The result was the broadcast disc player recorder type HS100, of which the BBC Television Center in London purchased the first example in the UK in autumn, 1968.(13)

The 1950's were the early days of the videotape recorder. This new technology would retard the development of the videodisc because of its capability to re-

record. However, according to Sigel, et al., the videodisc was still used in sports. Magnetic Video Recording provided a magnetic disc for video recording that provided stop action and instant replay for a CBS football pick-up on July 8, 1965. Improved to add slow motion and, later, color, these videodisc systems remain the backbone of sports coverage.(14)

In the late 1970's, the videodisc became the focus of many companies; according to Matthewson there have been 40 or so disc systems that have existed over the past 20 years.(15) Today there are basically three systems on the market, two are of the capacitance type and the third is the reflective optical disc.

There are two incompatible capacitance systems: JVC's system is called VHD (Video High Density) and RCA's system is called CED (Capacitance Electronic Disc). Capacitance videodiscs handle audio and video signals entirely by electrical means, through the agency of an electrode-bearing stylus or sensor actually in contact with the surface of the disc.(16)

The system used in this study was comprised of the Sony LPD-2000 laser videodisc player and the reflective optical disc (Laser disc). For this reason, the laser disc system will be discussed in greater detail than the capacitance system. Parsloe provides an excellent explanation of how laser videodiscs are produced. The

master disc is made of glass, optically ground and polished. A 0.1 micron membrane of light sensitive 'photoresist' is laid over this to form the 'substrate', or foundation, for the recording stage, which is essentially photographic. The master videodisc is 'cut' by a laser beam which incises a pattern in the photoresist membrane, modulated by the signals recorded in the master tape. This is developed photographically to produce the pattern of shallow pits along a spiral track which is the heart of the reflective optical disc system. The freshly-cut master videodisc is first silvered (both for conductivity and also to facilitate inspection) and then electroplated with nickel. This metal plate is then separated from the glass master, carrying away a negative impression of it. This is the 'Father'. The negative profile is required for the manufacturing stage, but this first impression is still too fragile to be used to stamp out any quantity of replicas. More videodiscs are produced, in patriarchal order, each member of the family plated off the one before: the positive profile of the Mothers off the negative profile of the Father and the negative profile of the Sons off the positive profile of the Mothers. The final videodisc is essentially built from the top down. One side of the PMMA (Plexiglass) layer remains smooth and forms the outer surface of the finished videodisc. The other side is stamped from the

negative profile of the Son, to produce a positive profile descended from that of the glass master. This replica is immediately coated with a thin layer of special lacquer. An extremely fine aluminum membrane is laid over this to produce the essential reflective layer. A protective plastic coating completes one single-sided videodisc. All videodiscs are double-sided, whether or not there is anything recorded on the second side. So the two single surfaces are bonded together with the smooth face of the PMMA layer forming the outer shell.(17) This coating protects the videodisc from dirt and scratches. Thus, the videodisc can be easily handled compared to phonograph records or even videotape. This durability is one of the advantages the videodisc has over videotape.

The information in optical videodiscs is encoded in the form of microscopic pits pressed into a spiral configuration in the disc surface. Information stored in these pits is "read" by a laser beam and transmitted to a decoder in the player. A 360 degree segment of the spiral is called a track.(18)

Parsloe discusses in greater detail how the information is read. In play, the disc is read by a helium neon laser within the disc player. The beam is locked on track by a seruo-control (a mechanism which converts a small force into a large one) to maintain precise focus and synchronizations. A pinpoint beam of intense light is

sent along a path of gratings, prisms, lenses and mirrors onto the underside of the videodisc.(19) Under the control of a scanning lens, this light hits the surface of the videodisc and is bounced off the reflective aluminum layer. This is of course a precise imprint of that pattern of shallow pits and grooves first recorded on the glass master videodisc. The uneven pattern of the pits and grooves causes variations in the light reflected off the surface of the videodisc. The reflected light is sent back along the path and through a photosensitive diode which converts these variations into the electrical signals from which video and audio signals are derived. (20)

There are two types of reflective optical videodiscs: the CAV (Constant Angular Velocity) and CLV (Constant Linear Velocity). The CAV videodisc is appropriate to sport for the following reasons. In technical terms, the videodisc is played at a constant rate of 1800 rpm to achieve 30 frames per second of play for the NTSC standard. In simpler terms, this means one frame per revolution. The NTSC standard refers to the type of television signal used in North America. Because of the one frame per revolution ability, any frame on the videodisc can be identified (by a frame number). This is called a frame address and allows for extremely accurate retrieval. Frame address along with rapid access time are

two important advantages of videodisc over videotape. The new Sony LDP 2000 videodisc player can access a frame in less than 1.5 seconds. Considering that a CAV videodisc has 30 minutes playing time per side, that same accessibility on videotape may take a few minutes. This random access feature has several applications in sport. The coach may want to discuss a certain lay up play in a basketball game. By playing a videodisc consisting of several games the particular play could easily be demonstrated in actual game situations. The coach would use the search mode by typing in exact frame numbers rather than doing a haphazard search as in videotape.

Those who have used videotape during a presentation have experienced the annoyance of not quite finding the start of the segment they wish to show. The result is usually a shuffling back and forth or watching an unrelated segment until the proper subject comes along.

Videodisc players can create still pictures from any of the 54,000 frames (per side) by repeating the same track on the disc rather than going on to the next. Each track on a CAV videodisc contains one video picture, so repetition of a track results in the continuous presentation of a still frame or a freeze frame. A freeze frame effect is caused when the action is stopped at one among many frames of a motion sequence. A still frame may be a single frame designed specifically for use in the still

frame mode of play (such as text, art or still photographs). Because nothing but a beam of light comes into contact with the videodisc surface during play, one frame can be displayed indefinitely with no harm to either player or videodisc.(21) This feature is yet another important advantage over videotape technology. Especially in teaching a sport skill, the instructor may want to point out and discuss certain positions. When using a videotape, after a few minutes the instructor must interrupt their discussion to change the picture or turn the tape off to avoid burning out the tape. In some instances, the machine itself may automatically turn off just as the instructor is pointing to a position. This problem would not occur when using a videodisc and thus would allow the instructor to concentrate on the subject rather than the media equipment.

Not only is there less wear and tear on a videodisc as compared to a videotape, in terms of the pause control, but also in overall general use. After a tape is played several times its visual and audio clarity begin to diminish. Currently the shelf-life of the videodisc is considered indefinite. Accelerated aging tests and extreme humidity and temperature tests have been carried out to determine the life expectancy of the commercially manufactured videodisc. Resulting estimates vary from 10 to 100 years, but given normal storage conditions, some-

where between the two estimates is likely.(22) Certainly this is not a very exact estimate, but it does indicate videodisc shelf-life is considerably longer than that of videotape.

Another feature of the CAV videodisc which applies to sport is the step frame or step motion ability. Step motion results when the user commands the player to move from one freeze frame to the next.(23) This capability allows the instructor to control the rate of 'stepping' through a movement by pressing the frame advance button on the remote control. Slow motion can be offered at various rates between normal speed and step motion. From personal experience, the author suggests some additional advantages of the videodisc over videotape (in regard to the above features) include improved clarity and lack of interference (noise bars) when working in speeds other than normal.

The CLV (Constant Linear Velocity) videodisc does not have many applications to sport because it is not frame accurate. Since one spiral track may contain more than one video frame it is impossible for the laser beam to isolate a single frame on a single track. Thus the configuration of a CLV videodisc does not allow it to be played with freeze frames, step motion, slow motion, frame searches, or picture stops.(24) The CLV videodisc is

currently popular in the area of home entertainment (movies).

Future development in videodisc technology would appear to be towards producing a videodisc that can be erased and re-used. This feature would then make the videodisc competitive with the videotape market. At present, the videodisc is mainly used for military, industrial and educational projects. In order to compete in the consumer market, the videodisc must be able to surpass the videotape in quality and feature options.

The Authoring System

Parsloe defines an authoring system as a collection of authoring programs that allow users without formal computer programming skills to prepare applications courses, often working in everyday language and without the painstaking detail of computer programming proper. Authoring language is a high level computer program, itself often based on a computer language like BASIC or Pascal, that facilitates the preparation of computer programs by reducing the number of instructions involved and translating these into a language resembling everyday English.(25) Thus, an instructor with little computer programming ability is able to design a course concentrating on content rather than debugging a computer program.

COURSEWRITER was the authoring system used in this study. As mentioned earlier, COURSEWRITER was designed for use with the IBM Personal Computer. Table 1, in Appendix B, describes the minimum equipment requirements for using COURSEWRITER for Level three interactivity. The equipment used for this study is also described. The IBM PC/XT computer was chosen over the SONY system because the IBM system is more versatile for use in projects other than interactivity. The SONY LDP-2000 videodisc player was the most recent model available offering a worst access time of 1.5 seconds. This model can easily be updated to offer still frame audio, a feature that may be required for future studies. The standard IBM monitor is not used during course play because it is not capable of showing video, videotex text and graphics or video with text and graphics superimposed. For this reason, an additional RGB monitor is required. The printer can be used during course development to obtain print-outs of file catalogues, programs or other information. It can also be used to provide the student with printed course material.

There are five floppy disks, which contain COURSEWRITER material, that are used to develop a course. Disk 0 is used together with the DOS 3.1 disk to set up the COURSEWRITER system so that it will be compatible with the specific configuration of the computer. Disk 1 is the

system disk. It contains COURSEWRITER programs to define course size, assemble courses so they can be played back and specify many of the general features of a course. This logic disk provides the programs and features that tie together the functions offered by the other COURSE-WRITER system diskettes. Disk 2 is used to create pages, one at a time, each of which is generally one screen of information that is presented to the student.

Each page has a unique identity and the same page can be used more than once within a course, or in more than one course. Entry of questions, creation of test question 'banks' and creation of specific tests is done through Disk 3. COURSEWRITER uses videotex for all its text and graphical displays. Disk 4, the videotex disk, is used to create diagrams, graphics and 'non-standard' pages of text.(26) Although all five of these disks are used to create a course, once assembled, the course resides on a separate diskette(s).

A COURSEWRITER course consists of 1 to 19 Domains. A course is a complete package of information about a topic. A domain may be considered a chapter within that package. Each domain is made up of 0 to 19 Modules. Modules are major topics or sections within each domain. Each Module can have up to 150 pages, each of which generally corresponds to one screen of information that the student will be shown during course playback. Pages

can be mixed in any sequence within a Module and may consist of: normal text; diagrams or graphics; video scene or single frame from videodisc; hard-copy (student handout); programmer's pages and question pages.(27) COURSEWRITER offers quite an elaborate testing system. Decisions can be made through multiple choice, true/false, fill-in-the-blank, or short answer questions or picking out portions of a diagram, graphic or single video frame or one frame from a video sequence. From each question there are six possible choices or branches to follow. Each Domain can have one formal test (post-test) with up to 150 questions of four different types (mixed in any sequence). The test can consist of compulsory questions and/or a selection from a group of random questions. Tests can be compulsory or optional for the student. Passing each test before moving on to the next topic can also be either mandatory or optional.(28)

To create graphics, text or diagrams, an author would use the COURSEWRITER Videotex features. The precise implementation of Videotex used by COURSEWRITER was originally developed in Canada under the name 'Telidon'. Telidon (or Videotex) is a set of rules for easy and efficient creation, storage, retrieval and display of pictorial and graphical information on television screens and computer terminals. The end-product of Videotex/Telidon is a normal TV image, but it is an image with a

difference; it comes not from a TV camera or VCR, but from a computer. The computer, therefore, has to create the thousands of dots to make up a picture which will, in its finished form, show text or graphics or both.(29) Each picture is created by a set of PDI (Picture Description Instruction) codes which are made up of mneonics. Mneonics are abbreviations of English terms, for example, RE for a rectangle. The codes are sent to the decoder which converts them into a TV image and then sends the image to the monitor for viewing.

Overall this software package may appear complicated, however, it is extremely easy to use. The author simply uses a keyboard to type in each page of the designed course and follows instructions on the screen and in the manual. COURSEWRITER assembles and creates the course. After evaluating and revising the course the author duplicates it on other diskettes for distribution to students.

Development of an Interactive Course

The development of an interactive course can be broken down into a number of stages:

Stage One: Front-end analysis

Stage Two: Course analysis

Stage Three: Course development

Stage Four: Production

Stage Five: Post production.

Stage One: Front-end analysis

Front-end analysis would include an assessment of: the problem or subjects' needs for interactivity; existing materials and media pertaining to the subject; time and cost of developing a program; and possible outcomes of the course.

If a subject or a training procedure must be taught step by step in a linear fashion, there is little need for branching or interactivity. Interactivity would be suitable for a teacher wishing to offer a course at two levels, one level for the average or slow student and an accelerated level for the above average student. Or, a course may be offered in two languages, each on a different audio track. Videodisc is very useful for showing experiments which take too much time, too much equipment, too expensive equipment, too much set-up time, or are too dangerous (many chemistry experiments).(30)

Level three interactivity is particularly appropriate for simulation and, according to Floyd and Floyd, more conducive to learning. The learner becomes more intimately involved with the program because judgement is required; a simulation of the probable action resulting from the response can be seen. Therefore, the degree of

involvement is higher between the user and the system.(31) Learning is more effective when the learner sees what occurs when choosing the wrong answer rather than just being reminded of the correct answer (as in a linear presentation).

Existing materials must be assessed in terms of appropriateness, quality and availability. For example, when editing a two-on-one play from several hockey films, it is more visually effective if: all of the jerseys match and angle shots of the play, zoom shots, and arena environments are similar. Most importantly, the play must demonstrate exactly what the author intends it to. If it does not, it should not be used and an original segment should be produced. Videodisc offers greater clarity over videotape, especially if the material being reproduced is original or within one or two generations. This original quality is required because a program will go down at least three more generations before it gets to the videodisc. Each separate tape of a program created in the production, editing or duplication process is a generation.(32) Therefore, by the time a program reaches the videodisc it may be fifth generation. If the quality is not acceptable again an original production may have to be considered. Existing materials may be readily available, however, reproduction may be restricted due to copyright. The author of the course may seek permission to use the

product or may purchase existing footage. For example, Encyclopedia Britannica Films sells film clips from its "Encyclopedia" file for $216 per minute or for a discount price of $75 per minute if the film clips are to be used in local programs only.(33) The costs for producing motion sequences for videodisc are approximately $2500.00 US per linear video minute.(34) Therefore, it is much more economical to use existing materials to produce a videodisc.

The time and cost to produce an interactive videodisc course can only be estimated. James Wallbeoff, Supervisor of Technical Training - Program Design of United Technologies Pratt and Whitney told the author that they had produced their own videodisc within eight weeks for approximately $50,000 US.(35) However, this cost does not include their in-house production costs and is for an original course from scratch to finish. An instructor developing a course using existing materials may only need to purchase a videodisc and a few floppy disks. Videodiscs vary in price from $19.95 US to several hundred dollars. The James Fixx videodisc used for this study cost $54.60. The media equipment, computer and authoring system, in total, cost approximately $12,000. This equipment would be required regardless of producing a course using original or existing materials. Therefore, an instructor could easily produce a course for less than

$100.00. This cost factor does not take into consideration the instructor's time required to develop a course.

The possible outcomes of the course must be addressed. Use of such a course may increase learning and retention of presented information; it may give the slow learner the opportunity to totally grasp a concept; it may prevent the accelerated learner from boredom; or it may allow the teacher to supervise and offer extra help to those who need it. What the course will do must be considered from the management's or instructor's point of view as well as what it will do for the student.

Stage Two: Course analysis

The student's objectives are part of the next stage: the Course Analysis. According to Floyd, the objectives must define what the learner participant will achieve as a result of using this material.(36) In both the management and student objectives criteria for evaluating accomplishment of the task should be included.

Floyd and Floyd suggest that a strategy statement should describe the type and degree of interaction planned.(37) The subject matter should be outlined in a traditional linear sequence. This sequence is examined and natural breaks in the material are determined. Within these segments, difficult or confusing material is recognized and remedial segments are outlined for them.

What type of feedback and how it is going to be presented; branching configurations; User Control of the course such as entry (loading time of the programme) or stopping in the middle of a module; test design and record keeping are all considerations for the next stage of instructional design.

Stage Three: Course development

In this next stage, the instructional design is illustrated through the use of a flowchart. Parsloe states that the flowchart for an interactive video programme should identify: every segment of moving footage; every still frame; every screen of computer-generated text and/or graphics; all the branching options being offered to the user; the choices the user might make at each menu, index or decision point and the consequences of these and every point at which the programme can be entered or left.(38) Although there is no universal standard for the structure or symbols, the author has included an explanation of the most common symbols in Appendix C.

After the flowchart is developed, the script is written for each page of the course. COURSEWRITER provides specific forms to ensure the author has all the information required to assemble the course. Once assembled, the author can revise the course as required.

Then the author can start evaluating the objectives (using the results of the students' tests automatically recorded by COURSEWRITER).

Stage Four: Production

If using existing materials, such as in this study, there is no need to proceed to the production and post-production stages. Those stages will be discussed briefly in order to offer the reader a complete understanding of videodisc production. A videodisc is produced by a number of people who are members of a production team. The size, design and budget determines the size of the team. A project manager oversees the entire project and may also be the producer who is responsible for editorial content. The instructional designer arranges and presents the information provided by the content specialist. There may be a script writer, art director, video director and a screen director, all of whom work towards the best style, flow and presentation of information. The director is responsible for the shooting of original video footage. The computer programmer develops the computer language to be encoded on the videodisc or for an external computer. A production assistant or secretary keeps track of the shooting sequences (shot list) and documents each stage of production.

In pre-production facilities are booked; technical and professional staff are hired; music or sound effects are selected and copyrights are cleared. Parsloe describes the production stage as more than just shooting footage. It includes preparing original art work; photographing still frames; special effect preparation; transferring material from other source media onto videotape and recording voice-overs, music and sound effects.(39)

Stage Five: Post production

In post-production, the layout of audio, video and control tracks are planned. They are then assembled, reviewed and approved in an off-line edit. The on-line edit is completed and frame reference numbers are assigned to the master videotape. These frame reference numbers are entered in the flowchart and the computer program. The information programme is assembled, tested and refined. The finished programme is then simulated in part or whole prior to sending the master tape to a disc-pressing facility.(40)

CHAPTER IV

METHODS

As previously mentioned, the stages pertinent to this study were front-end analysis, course analysis, and course development. Further detail of each stage, as experienced in the particular course in this study, will be presented in the following series of logical steps. These steps could be followed by any instructor to develop a course.

Stage One: Front-end analysis

1. Determine the need for interactivity

The target audience for this course was first year physical education students participating in an introductory activity course. Beginner Running was one of five activities offered in the course. The activity class on Beginner Running was offered once a week for one hour over a six week period. The main problem the course instructor had was not enough class time to present imperative information. The solution was to provide the students with additional information in the form of a self study course.

2. Assess existing materials

Relevant information in a customized sequence was developed for the Beginner Running course. This sequence was very different from the original presentation of the

James Fixx videodisc. Appropriate topics and scenes related to beginner running were selected and combined with material selected from various references. As a result, students concentrated on specific information rather than being inundated with general interest tidbits.

3. Assess the time and cost of course development

The time required to develop the course for this study was approximately seventy hours. Initial research time to locate and select relevant information was ten hours. This time allowance would be shorter for the course developer with subject expertise and/or references on hand. The front-end analysis, which included discussion with an instructional design expert, research and assemblage took three hours. As all of these stages overlapped, it was difficult to separate time allowance for each stage, particularly in the case of course analysis. This stage was discussed in detail with front-end analysis. For example, in order to speculate on possible outcomes of the course management and student objectives, their evaluation must be considered. The author suggests three hours for course analysis development. Course development could be divided into four stages: design and course script (15 - 20 hours); transfer of script to COURSEWRITER format (10 hours); input of the course into the computer (25 hours) and revisions (5 hours). As this was the first time the

author used COURSEWRITER, it can be assumed future inputting would not take as long. On the other hand, a course developer should be prepared to spend many hours learning the technology and, in particular, the authoring system.

The course development cost was minimal because existing materials were used. Library books were used in addition to the James Fixx videodisc. The cost of the videodisc was $54.60. Ten computer diskettes ($29.95) were used to make back-up copies during various stages of input. Instructor time cost could be estimated at $2100.00 based on $30.00 per hour x 70 hours. However, as most university instructors would develop the course during working hours, this cost would only be a consideration if an outside expert was used.

4. Determine possible outcomes of the course

It was expected that the course would increase learning and retention of information presented on beginner running.

Stage Two: Course analysis

1. Determine management objectives of the course

The interactive Beginner Running course was designed to enhance and reinforce instruction offered during the activity class. The course including its final exam had to be completed within six weeks. Each student was

expected to work alone and at his or her own pace. Five work stations were available for use during Student Learning Lab office hours. The course developer suggested that students allot four hours to complete the course. Thus, ample time and equipment were available for the student to finish the course in six weeks.

The interactive Beginner Running course was also designed as a means of evaluation other than physical for this section of the overall activity course. Each activity was worth 20% of the total grade for the course. The Beginner Running 20% grade was determined by in-class activity evaluation and self study evaluation. The self study evaluation, worth 10%, was determined by the student's performance on the interactive Beginner Running course final exam. COURSEWRITER has a built-in student evaluation system. This system was attractive to the course developer because it eliminated the need to schedule an exam during class time, marking of the exam and statistical analysis of grades.

2. Determine student objectives of the course

The course developer expected the students, as a result of learning the material in the course, to be able to:

- identify the proper posture for running
- develop their own schedule for running
- identify how to avoid boredom while running
- identify ways to become a better runner
- identify the causes and treatments for foot, leg and knee injuries.

3. Determine the level of interaction planned

This study utilized level three interactivity because of its capabilities to: present information from a videodisc, pictures or text in order as determined by the course developer or pre-test entry level; allow students to proceed through the course at their own speed; present review material prior to an exam; present remedial material after an exam; manage student test results; analyze test questions; present students with a user-friendly computer system and actively involve students in learning.

Stage Three: Course development

1. Design a flowchart

The flowchart for this study was designed to be simple enough that the first time course developer could follow it when inputting the course. For example, the author created pages for the review module before defining and assembling the test module. In order to assemble the review module the test filename is required and the review module would not assemble without the existence of a test file. The author tried to assemble the review module prior to the test module because the review module was explained before the test section in the manual. The main reason the course was inputted in the order of the course logic versus the order of the forms was due to disk

space. The disk space required by the course was unknown, therefore the author rationalized that should the disk space fill during input at least part of the course would be presented in order. The author would suggest: defining course information; creating all pages (text, question, remedial, video and telidon); defining and assembling all modules, defining and assembling all test questions into one test question bank (file) and defining and assembling review modules. The flowchart for this study appears in Appendix D. The initial entry for this course allowed the student to choose between two domains and a final exam. Upon entry to a domain the student had to decide whether or not to take the pre-test. The pre-test consisted of four questions and required a pass level of 75%. If the students passed they proceeded to the domain test. If the students failed they proceeded through the domain material. Throughout the domain the student was provided the opportunity to review the module just presented. At the end of the domain the student was required to achieve a 75% pass (four questions) in order to advance to the next domain. As well, any question incorrectly answered automatically presented remedial material to the student prior to advancement.

2. Develop the script for the course

The entire script was initially developed on paper. This involved writing text (including test questions,

answers and remedials), drawing pictures, recording video frame numbers and designing title pages.

3. Transfer the script to COURSEWRITER forms

COURSEWRITER provides specific forms to ensure the course developer has all the information required to assemble the course. The author assembled the forms in the order of the course. This caused problems defining and assembling the review modules. Additional forms used by the author are in Appendix F.

4. Evaluate the objectives

Use the students' results to determine how much the student has learned. The final exam consisted of fifteen questions drawn from a bank of twenty questions. There were two compulsory questions, one from each domain test, the rest were randomly chosen. Therefore, each student in the class would receive a different test.

Student results for each question provided the course developer with a built-in analysis of questions.

5. Revise or update the course

The videodisc itself cannot be altered, but its presentation can be. Once evaluated, the course can be saved as is, duplicated, revised or expanded due to the versatility of the computer diskette.

The computer program for the Beginner Running course in this study is included in Appendix E.

CHAPTER V

SUMMARY

Interactive laser videodisc promises to be a viable means of instruction for the following reasons. Interactivity allowed the author to customize information on beginner running from an existing commercial videodisc about all forms of running. Interactivity allowed the author a variety of presentation modes, such as: text; graphics; digitized graphics and video. Presentation of video information was time efficient as the result of laser videodisc use rather than videotape. The student experiences active involvement in learning due to continuous decision making throughout the course. The student also receives immediate feedback as each decision was made.

In first using an authoring system there are limitations and/or problems one encounters. However, as one becomes more adept with the system it is often possible to overcome these difficulties. At the same time, the course developer may become more creative in course presentation.

Future application of this technology is dependent upon expanded production of videodiscs. This is particularly true in the area of sport to which the videodisc lends itself so well.

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Appendix A

Definitions of Terms Used

Appendix A

Definitions of Terms Used

Access Time - the time it takes to find, retrieve and display a piece of recorded information. Access time is usually measured at its worst, the longest it can take to get from one frame to another.

Authoring Language - a high level computer program, itself often based on a computer language like BASIC or Pascal, that facilitates the preparation of computer programs by reducing the number of instructions involved and translating these into a language resembling everyday English.

Authoring System - a collection of authoring programs that allows users without formal computer programming skills to prepare applications programs.

Branching - a decision point at which a program path can go in one of two or more directions.

CAI - Computer Assisted Instruction.

Capacitance - electrical capacity; the ability to store an electrical charge. Variations in capacitance between the disc and a pickup stylus or sensor are used to transmit recorded video and audio information.

CAV - Constant Angular Velocity is the mode in which a reflective optical disc revolves continuously at 1800 rpm. Each revolution corresponds to one frame, making each frame addressable.

CLV - Constant Linear Velocity extends normal playing time per side because of more than one frame per revolution.

COURSEWRITER - an IBM PC/XT compatible authoring system.

Decoder - a hardware device that accepts Videotex code from the computer and converts it into a TV image.

Disc - a videodisc.

Disk - a floppy disk (or diskette) used by microcomputers which is made of thin, flexible, magnetically-coated plastic.

Domain - a major topic with a lesson or course created with COURSEWRITER. A domain is made up of Modules.

Flowchart - a diagram showing the sequences of instructional events throughout the videc program.

Frame - one TV image.

Frame address - each frame on a videodisc is identified by a numeric code.

Freeze frame - a single frame in a motion sequence, which is stopped and held indefinitely.

Generation - in storage media, the number of times a reproduction is removed from its original source.

Hardware - computer equipment and its peripherals.

Interactive - involving the active participation of the user in directing the flow of the computer or video programme.

Laser disc - acceptable name for a reflective optical videodisc.

Mastering - the manufacturing process that creates a single metal disc from which others are then replicated.

Menu - displayed table of contents on a videodisc.

Mneonics - abbreviations of English terms, i.e. RE for rectangle.

Module - a minor topic within a Domain.

Page - generally what the user will see on the screen at one time.

Post-Production - the stage in the preparation of a film or video programme after the original footage has been shot. Post-production includes the editing stage and the preparation of the tape or film for reproduction as an interactive disc.

Pre-mastering - the stage in production of a videodisc when the master tape is checked and prepared for transfer onto the master videodisc.

Pre-production - all design tasks (scripting, storyboarding, flow charting, software design) prior to videodisc production.

Production - in video terms, that stage in the job when video or film footage is actually shot.

Search - the automatic accessing of a single frame by a frame number.

Step Frame - frame by frame advance. This feature can be automatic or user-controlled.

Still Frame - a graphic of any kind which is presented as a single, static image.

Telidon - a Canadian-developed Videotex system.

Videodisc - a generic term describing a medium of video information storage which uses thin circular plates, usually primarily composed of translucent plastic, on which video, audio and various control signals are encoded, usually along a spiral track.

Videotex - a set of rules through which geometric and non-geometric shapes and pictures can be created on a TV screen. Videotex pictures are stored as compact commands on disk or in computer memory. These commands are transmitted to a decoder which converts them into a TV image.

Appendix B

Table 1 - Equipment Requirements

Appendix B

Table 1 - Equipment Requirements

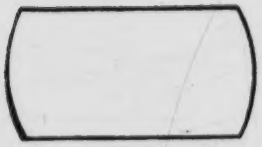
	Minimum Requirements	System Used in Present Study
Computer	IBM PC or PC/XT 192 K main memory 2 diskette drives or 1 diskette and 1 hard disk drive	IBM PC/XT 640 K main memory 2 diskette drives
Monitor	Monochrome or colour	Colour
Asynchronous Communications Adapter	Configured as a COM 1 port ('RS-232 Com 1')	IBM TYPE COM 1 PORT ('RS-232 Com 1')
Videotex decoder	Norpak Mark IV or V, Sony VDX 1000 or Electrohome model	Sony VDX 1000
Additional Monitor	RGB or composite	RGB-Sony PVM1271Q
Disk Operating System	DOS 2.0 or later version	DOS 3.1
Laser Videodisc	Sony LDP-1000A	Sony LDP-2000
Asynchronous Communications Adapter	Configured as a Com 2 port ('RS-232 Com 2')	AST Six Pack - second serial Com 2 port ('RS-232 Com 2')
Printer	Any compatible printer parallel port	IBM Pro-printer

Appendix C

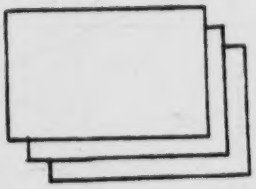
Flowchart Symbols

APPENDIX C

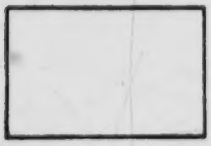
FLOWCHART SYMBOLS



Motion Sequence

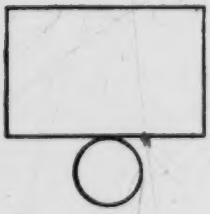


Series of Single Still Frames - step through



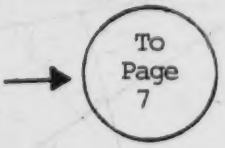
Still Frame

Decision or Choice



Timed Still Frame

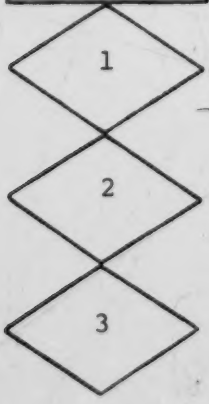
Connector Letter - Same page



Connector to Another page

Still Frame with Options to be selected by viewer

Start (Load) or End



Used for menus, questions, ect.

Direction Indicator

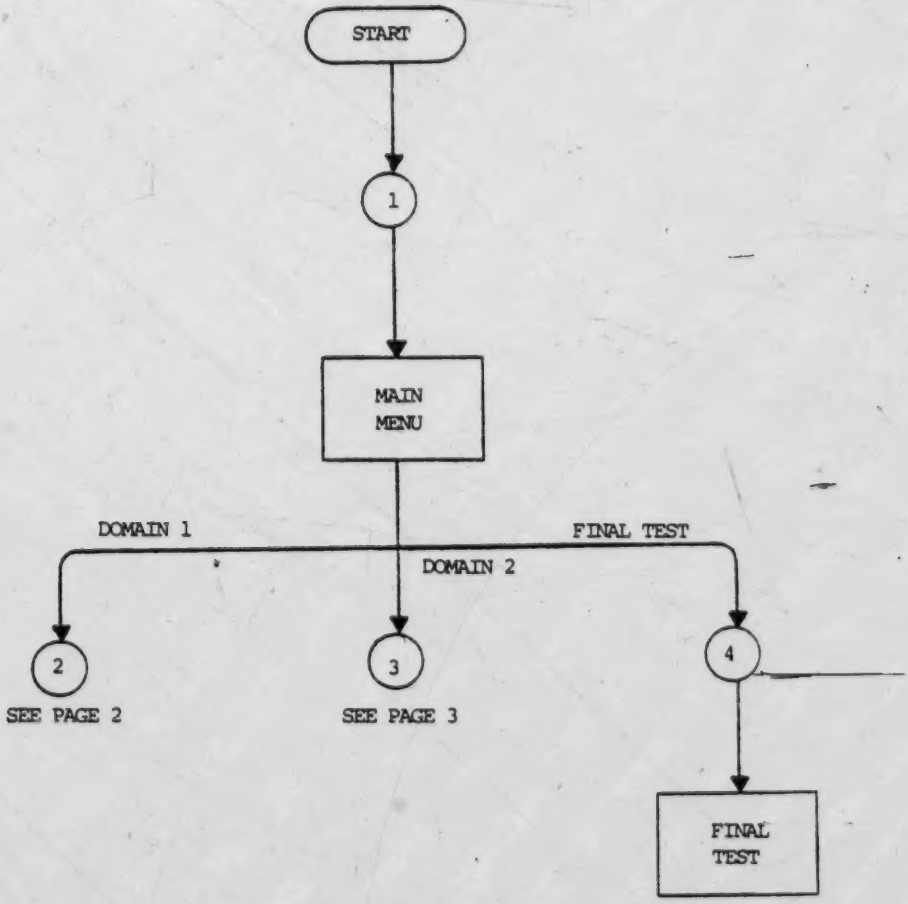
Appendix D

Beginner Running Course Flowchart

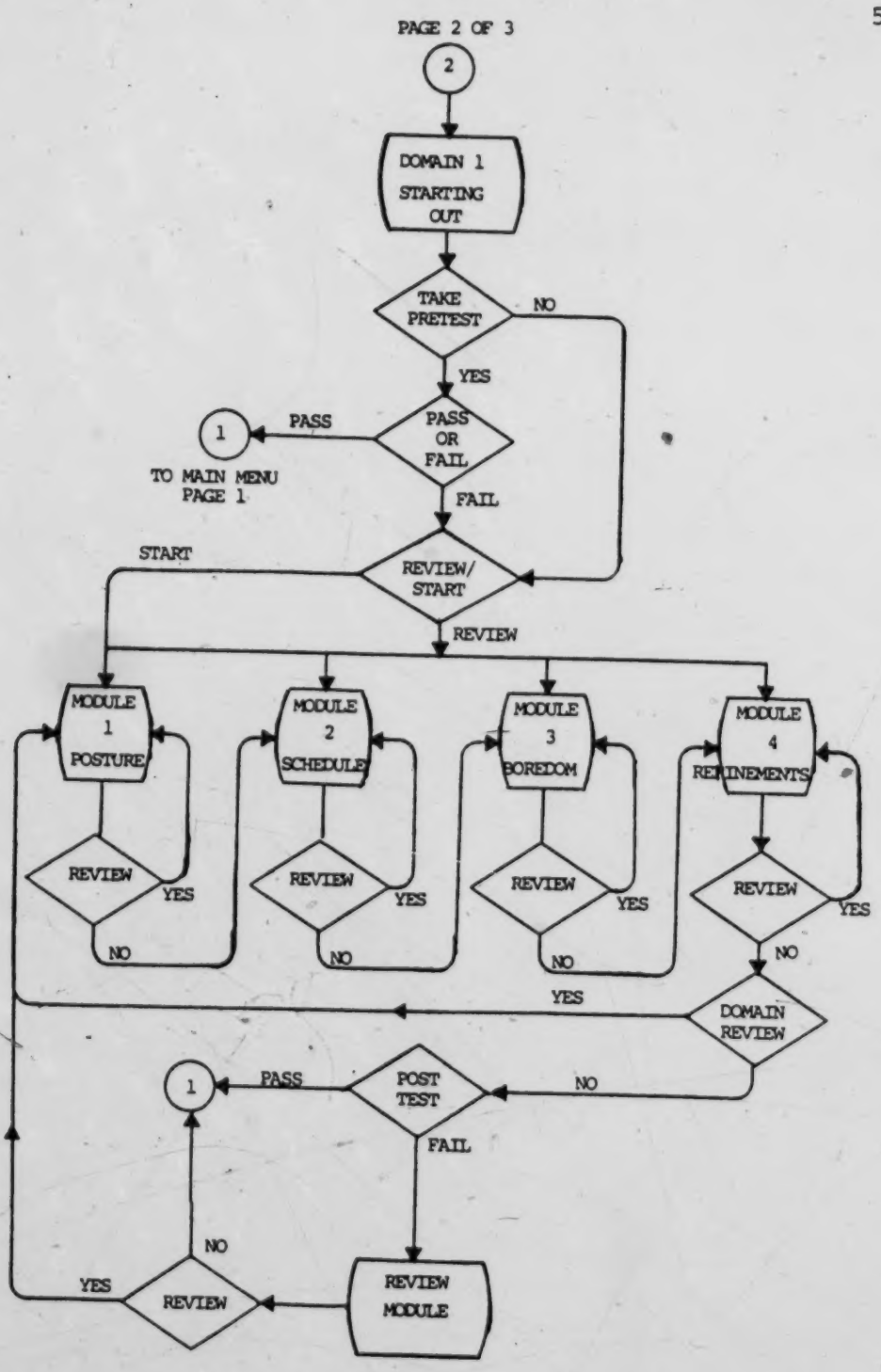
APPENDIX D

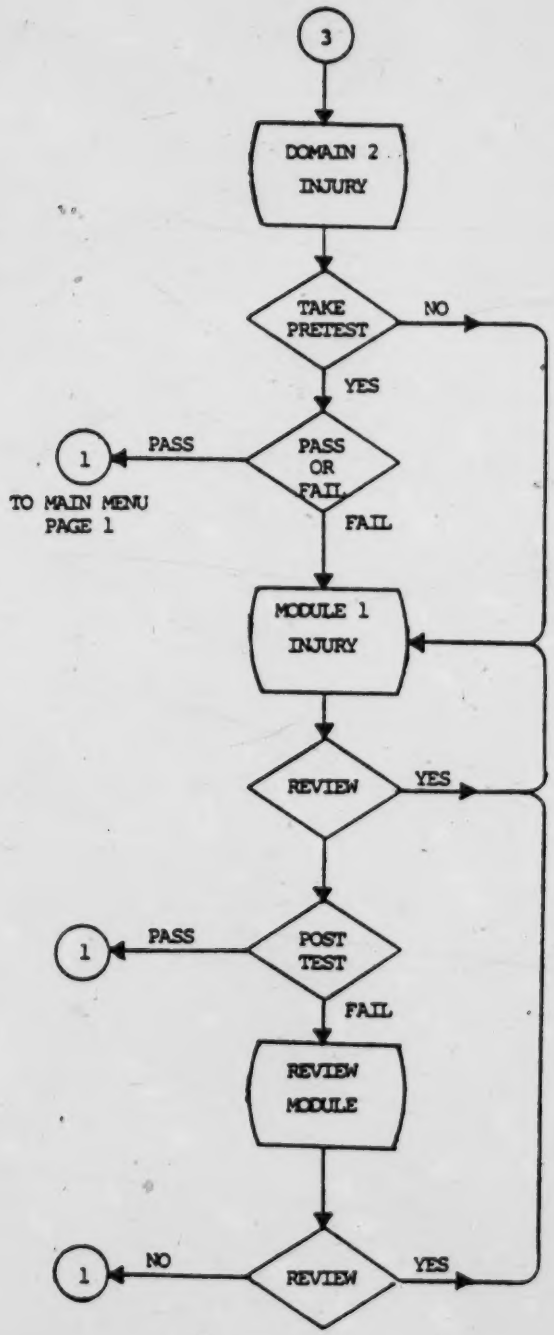
BEGINNER RUNNING FLOWCHART

PAGE 1 of 3



PAGE 2 OF 3


2
DOMAIN 1
STARTING OUT
TAKE PRETEST
NO
YES
PASS OR FAIL
1
PASS
TO MAIN MENU
PAGE 1
FAIL
START
REVIEW/ START
REVIEW
MODULE 1
POSTURE
MODULE 2
SCHEDULE
MODULE 3
BOREDOM
MODULE 4
REFINEMENTS
REVIEW
YES
NO
DOMAIN REVIEW
POST TEST
PASS
FAIL
REVIEW MODULE


3
DOMAIN 2
INJURY
TAKE
PRETEST
NO
YES
PASS
OR
FAIL
PASS
1
TO MAIN MENU
PAGE 1
FAIL
MODULE 1
INJURY
REVIEW
YES
POST
TEST
PASS
1
FAIL
REVIEW
MODULE
REVIEW
NO
1
YES

Appendix E

Beginner Running
COURSEWRITER PROGRAM in BASIC

```
5 REM  Module name : D01M01.MOD
6 REM
7 NXTMOD$="D01M02.MOD"
8 REM
10 REM ****************************************
11 REM *  Coursewriter Module Base Driver     *
12 REM *  (Sony decoder & Keyboard version)   *
13 REM *                                      *
14 REM *  Driver release date : 15-OCT-83     *
15 REM *  Driver last modified:               *
16 REM ****************************************
17 REM
20 DEFINT A-W,Z
25 CONESEC=700:PRESSOPT=0
30 OPEN "STUDENT.NAM" FOR INPUT AS #1:INPUT
#1,LASTNAME$,FIRSTNAME$,MAXDOMCP,CDOM,CINDEX,TIT1$:INPUT
#1,TELI$,VIDO$,DRIVDR$,DIRCTDR$,DRIVMO$,DIRCTMO$,DRIVT
S$,DIRCTTS$:CLOSE #1
35 OPEN "testopt.dta" FOR INPUT AS #1:INPUT #1,REVW$:CLOSE #1
40 OPEN TELI$ AS #2:PRINT #2,CHR$(14)"8@@@["CHR$(127)CHR$(127);
50 VIDEO$="DISK"
60 IF VIDEO$<>"OFF" THEN OPEN VIDO$ AS #3              'replace when
assembled
90
PRECONT$=CHR$(16)+CHR$(2)+CHR$(17)+CHR$(36)+CHR$(119):POSTCONT$=CHR$(1
6)+CHR$(3)
170 REM ***************************************************
171 REM *    Variable usage                                 *
172 REM *  a%        - used for branch page pointers        *
173 REM *  numat     - number of brnaches on a page          *
174 REM *  upbnds()  - area definitions upper limit         *
175 REM *  lobnds()  - area definitions lower limit         *
176 REM *  ribnds()  - area definitions right limit         *
177 REM *  lebnds()  - area definitions left  limit         *
178 REM *  video$    - Flag for video OFF/TAPE/DISK         *
179 REM *  ix        - cursor pointer x value               *
180 REM *  iy        - cursor pointer y value               *
181 REM *  tmvl      - time in seconds for delay            *
182 REM *  a$        - general string input                 *
183 REM *  I         - general used as an index             *
184 REM *  stm       - used as the timing index             *
185 REM *  CONESEC    - Value for 1 second loop (interp)    *
186 REM *                                                   *
187 REM *                                                   *
188 REM *                                                   *
189 REM *                                                   *
190 REM *                                                   *
191 REM *                                                   *
192 REM *   Note all variables beginning with A-W and       *
193 REM *   Z are integers by definition.                   *
194 REM ***************************************************
195 ON COM(1) GOSUB 65000:COM(1) ON
197 GOTO 2000
```

```
200 REM   Question page reply and branch
210 A$=INKEY$:IF A$="" THEN 210
220 IF A$=CHR$(13) THEN 210
230 A%=VAL(A$):IF A%<1 OR A%>NUMST THEN 210
240 RETURN
250 REM   Sensitive area response and branch
260 GOSUB 64010:I=0:A%=0
265 I=I+1:IF I>NUMST THEN 260
270 IF IY<=UPBNDS(I) AND IY=>LOBNDS(I) AND IX=>LEBNDS(I) AND
IX<=RIBNDS(I) THEN A%=I:RETURN 275 GOTO 265
300 REM   Timed page wait
310 A$=TIME$:A=VAL(MID$(A$,4,2))*60+VAL(RIGHT$(A$,2))
312 B$=TIME$:B=VAL(MID$(B$,4,2))*60+VAL(RIGHT$(B$,2)):IF B-A<TMVL
THEN 312
314 RETURN
320 REM   Press key page wait
325 IF PRESSOPT<>0 THEN BEEP ELSE PRINT
#2,CHR$(14)">x|"CHR$(27)CHR$(76)CHR$(27)"H$@xF"CHR$(15)"Press space
to continue"CHR$(14)CHR$(27)CHR$(73)CHR$(14); 330 A$=INKEY$:IF A$=""
THEN 330
335 IF A$<>" " THEN 330
340 IF PRESSOPT=0 THEN PRINT
#2,CHR$(14)">x|$@xF"CHR$(15)SPACE$(23)CHR$(14);
345 RETURN
350 REM   Wait for video
355 IF VIDEO$="OFF" THEN BEEP:PRINT
#2,CHR$(14)">x|"CHR$(12)"$BxF"CHR$(15)"Logic error Video
off"CHR$(14);:GOTO 62___        'goto the exit to domain menu 360 IF
VIDEO$="DISK" THEN 380   'change when activated
365 GOTO 320  'change when activated
378 REM Wait for program on video disc
379 REM
380 GOSUB 750:PRINT #3,CHR$(103);:FOR I=1 TO 50:NEXT I:GOSUB 750:IF
RIGHT$(FR$,1)=CHR$(10) THEN FR$=LEFT$(FR$,LEN(FR$)-1) 382
C$=LEFT$(RIGHT$(FR$,3),1):C=ASC(C$):IF C<128 THEN RETURN
392 JJ=0:GOSUB 750:FOR IJ=1 TO LEN(FR$):IF MID$(FR$,IJ,1)=CHR$(4) OR
MID$(FR$,IJ,1)=CHR$(1) THEN JJ=1
394 NEXT IJ:IF JJ=0 THEN 392
396 RETURN
400 REM
401 REM   Special SONY functions
402 REM
410 CMTL=48:GOTO 430              'diskplay both halves
412 CMTL=49:GOTO 430              'display only left half
414 CMTL=50:GOTO 430              'display only right half
416 CMTL=64:GOTO 430              'both sides write mode
418 CMTL=65:GOTO 430              'left half write mode
420 CMTL=66:GOTO 430              'right half write mode
422 CMTL=67:GOTO 430              'expand from right half to full display
424 CMTL=68:GOTO 430              'shrink full display to left half
430 PRINT #2,PRECONT$CHR$(CMTL)POSTCONT$;:RETURN  'REM Handle special
finctions 470 CMTL=32:GOTO 430    'REM Handle telidon video
480 CMTL=33:GOSUB 430:CMTL=34:GOTO 430    'REM Handle video source
vid
490 CMTL=33:GOTO 430    'REM Handle both video sourc
```

```
500 REM   Position video tape
505 RETURN
600 REM Video disk control
601 REM
610 IF VIDEO$="OFF" THEN BEEP:PRINT
#2,CHR$(14)">x|"CHR$(12)"$BxF"CHR$(15)"Logic error Video
off"CHR$(14);:GOTO 62___        'goto the exit to domain menu
612 IF VDCMD$="STILL" THEN 640
614 IF VDCMD$="USERC" THEN 660
618 REM Play type video disc control
619 REM
620 PRINT #3,INDX$;:FOR IJ=1 TO LEN(VIDEOCMD$):PRINT
#3,MID$(VIDEOCMD$,IJ,1);:FOR JI=1 TO 10:NEXT JI:NEXT IJ:TMVL=0:GOSUB
310:PRINT #3,AUD$"W1X";:RETURN 638 REM Single frame display
639 REM
640 VIDEOCMD$="VC"+FRAME$+"@":PRINT #3,INDX$;:FOR IJ=1 TO
LEN(VIDEOCMD$):PRINT #3,MID$(VIDEOCMD$,IJ,1);:FOR JI=1 TO 10:NEXT
JI:NEXT IJ:RETURN
658 REM User control of player
659 REM
660 FOR IJ=1 TO LEN(VIDEOCMD$):PRINT #3,MID$(VIDEOCMD$,IJ,1);:FOR
JI=1 TO 10:NEXT JI:NEXT IJ:TMVL=3:GOSUB 310:PRINT #3,INDX$;
665 GOSUB 750:PRINT #3,CHR$(96);:FOR I=1 TO 50:NEXT I:GOSUB 750:GOSUB
770:FRNO=VAL(FR$) 670 A$=INKEY$:IF A$<>CHR$(13) AND
A$<>CHR$(0)+CHR$(75) AND A$<>CHR$(0)+CHR$(77) THEN 670 675 IF
A$<>CHR$(13) THEN 700
680 IF FRNO<VAL(VDMATCH$)-VDR2 OR FRNO>VAL(VDMATCH$)+VDR2 THEN
A%=6:GOTO 690
681 IF FRNO<VAL(VDMATCH$)-VDR1 THEN A%=5:GOTO 690
682 IF FRNO>VAL(VDMATCH$)+VDR1 THEN A%=4:GOTO 690
684 IF FRNO<VAL(VDMATCH$) THEN A%=3:GOTO 690
686 IF FRNO>VAL(VDMATCH$) THEN A%=2:GOTO 690
688 IF FRNO=VAL(VDMATCH$) THEN A%=1
690 IF A%<1 OR A%>6 THEN 665
692 IF A%>NUMST THEN 665
694 RETURN
700 IF A$=CHR$(0)+CHR$(75) THEN 730
708 REM advance frame
709 REM
710 IF FRNO+1 >VAL(VDSTOP$) THEN SOUND 80,8:GOTO 670
720 PRINT #3,CHR$(61);:FOR I=1 TO 100:NEXT I:PRINT #3,CHR$(79);:GOTO
665 728 REM reverse frame
729 REM
730 IF FRNO-1 <VAL(VDSTART$) THEN SOUND 80,8:GOTO 670
740 PRINT #3,CHR$(77);:FOR I=1 TO 100:NEXT I:PRINT #3,CHR$(79);:GOTO
665
750 FR$="":LOCATE 2,1
752 WHILE NOT EOF(3)
754       ZB$=INPUT$(LOC(3),#3)
756       FR$=FR$+ZB$
758 WEND:RETURN
770 A$="":FOR I=1 TO LEN(FR$):IF ASC(MID$(FR$,I,1))>47 AND
ASC(MID$(FR$,I,1))<58 THEN A$=A$+MID$(FR$,I,1) 772 NEXT
I:FR$=A$:RETURN
```

```
800 REM Please wait
810 PRINT #2,CHR$(14)">x|"CHR$(27)"L"CHR$(34)"@@$HXc"CHR$(15)"Please
wait"CHR$(14);:RETURN
2000 PRINT
#2,CHR$(14)">@<@@@>D<GG@>H<xG@>L<"CHR$(127)"@@>P<IIH>T<rRp>X<dd'>\<"CH
R$(127)CHR$(127)"x>'<mmh>d<[[X>h<iIH>l<SZP>p<T@P>t<RRP>x<vvp>|<HA@>x|"
CHR$ (12)" AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13);
2002 PRINT
#2,CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)" Welcome
to the BEGINNER RUNNING COURSE"CHR$(13)CHR$(10)"in which you will
utilize t he          "CHR$(13)CHR$(10)"interactive ";
2004 PRINT #2,"capabilities of the laser  "CHR$(13)CHR$(10)"videodisc
in conjunction with the IBM  "CHR$(13)CHR$(10)"XT microcomputer.
This course feature s"CHR$(13)CHR$(10)"the Jim Fixx on Running ";
2006 PRINT #2,"videodisc.
"CHR$(13)CHR$(10)CHR$(14)CHR$(14)"8@@@["CHR$(127)CHR$(127);
2010 GOSUB 470
2015  GOSUB 325
2020  GOTO 2200
2200 PRINT
#2,CHR$(14)">@<@@@>D<GG@>H<xG@>L<"CHR$(127)"@@>P<IIH>T<rRp>X<dd'>\<"CH
R$(127)CHR$(127)"x>'<mmh>d<[[X>h<iIH>l<SZP>p<T@P>t<RRP>x<vvp>|<HA@>x|"
CHR$ (12)CHR$(27)"K"CHR$(34)"@@$IMV"CHR$(15)"Starting";
2202 PRINT #2," Out"CHR$(14)">t"CHR$(34)"@@$IMM"CHR$(15)"Starting
Out"CHR$(14);
2206 GOSUB 470
2211  TMVL= 5 :GOSUB 310
2216  GOTO 2400
2400 PRINT #2,CHR$(14)">x|"CHR$(12)"
AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13)CHR$(10)CHR$(10)CHR$(10)CHR$
(10)"STARTING OUT consists of 4 modules     "CHR $(13)CHR$(10)"which
run simultaneously.  The";
2402 PRINT #2," modules
"CHR$(13)CHR$(10)"are:
"CHR$(13)CHR$(10)"
"CHR$(13)CHR$(10) "1.  Posture                                    "CHR$(13);
2404 PRINT #2,CHR$(10)"
"CHR$(13)CHR$(10)"2.  Schedule
"CHR$(13)CHR$(10)"
                    "CHR$(13)CHR$(10)"3.  ";
2406 PRINT #2,"Boredom
"CHR$(13)CHR$(10)"
"CHR$(13)CHR$(10)"4.  Refinements
        "CHR$(13)CHR$(10)CHR$(14)CHR$(14)"8";
2408 PRINT #2,"@@@["CHR$(127)CHR$(127);
2412 GOSUB 470
2417  GOSUB 325
2422  GOTO 2600
2600 PRINT #2,CHR$(14)">x|"CHR$(12)"
AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13)CHR$(10)CHR$(10)CHR$(10)CHR$
(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)"
         P O S T U R E              "CHR$(13);
2602 PRINT #2,CHR$(10)CHR$(14)CHR$(14)"8@@@["CHR$(127)CHR$(127);
2606 GOSUB 470
```

```
2611  TMVL= 5 :GOSUB 310
2616  GOTO 2800
2800
VIDEOCMD$="E001@08978@10188@VW1@:1@@":VDCMD$="NORML":AUD$="FH":INDX$="Q"
:GOSUB 600
2805 GOSUB 480
2810  TMVL= 3 :GOSUB 310
2815  GOTO 3000
3000 PRINT
#2,CHR$(14)">@<@@@>D<GG@>H<xG@>L<"CHR$(127)"@@>P<IIH>T<rRp>X<dd'>\<"CHR$
(127)CHR$(127)"x>'<mmh>d<[[X>h<1IH>1<SZP>p<T@P>t<RRP>x<vvp>|<HA@>1"CHR$(
 12)CHR$(34)"@@$Hak"CHR$(15)"JAMES FIXX"CHR$(14)"=";
3002  GOSUB 490
3004 PRINT #2,"\"CHR$(127)CHR$(12);
3008 GOSUB 490
3013  GOSUB 355
3018  GOTO 3200
3200
VIDEOCMD$="E001@20396@20791@VW1@:1@@":VDCMD$="NORML":AUD$="FH":INDX$="
Q":GOSUB 600
3205 GOSUB 480
3210  GOSUB 355
3215  GOTO 62000
62000 REM This is where the module exit processing will take place
62010 GOSUB 470:PRINT
#2,CHR$(14)">x|"CHR$(12)"!H@@[2ZwLeZV!H@@@#@#@"CHR$(27)"L"CHR$(34)"@@"
CHR$(27)"I8@TmZYQ"CHR$(14)">|x#@3@JuZdV>x|"CHR$(27)"L"CHR$(34)" @'";
62020 PRINT #2,CHR$(34)"@@"CHR$(27)"I$JrW"CHR$(15)CHR$(13)CHR$(10);
62022 PRINT #2,"Do you want to review this module?";
62024 PRINT #2,CHR$(13)CHR$(10)CHR$(13)CHR$(10)"
(Y/N)"CHR$(14);
62030 PRINT
#2,">x|$BOr"CHR$(27)CHR$(76)CHR$(15)TIT1$CHR$(14)"8@@@["CHR$(127)CHR$(
127)CHR$(34)"@'";
62050 A$=INKEY$:IF A$<>"Y" AND A$<>"N" AND A$<>"y" AND A$<>"n" THEN
62050
62060 IF A$="Y" OR A$="y" THEN 2000
62100 GOSUB 810:COM (1) OFF:IF REVW$="REVIEWMODE" THEN 62200
62110 IF NXTMOD$="SYSTEM" THEN 62200
62120 RUN DRIVMO$+":"+DIRCTMO$+NXTMOD$
62200 SYSTEM
64000 REM This is where the cursor positioning takes place
64010 RETURN
65000 WHILE NOT EOF(2)
65010 A$="":A$=INPUT$(LOC(2),#2)
65020 IF RIGHT$(A$,1)=CHR$(19) THEN 65100
65025 IF A$=CHR$(19) THEN 65100
65030 IF RIGHT$(A$,1)=CHR$(17) THEN RETURN
65035 IF A$=CHR$(17) THEN RETURN
65040 WEND:RETURN
65100 COM(1) OFF:WHILE NOT EOF(2)
65110 A$=INPUT$(LOC(2),#2):IF A$=CHR$(17) THEN COM(1) ON:RETURN
65120 WEND:GOTO 65100
```

```
5 REM  Module name : D01M02.MOD 6 REM
7 NXTMOD$="D01M03.MOD"
8 REM
10 REM ****************************************
11 REM *  Coursewriter Module Base Driver     *
12 REM *  (Sony decoder & Keyboard version)   *
13 REM *                                      *
14 REM *  Driver release date : 15-OCT-83     *
15 REM *  Driver last modified:               *
16 REM ****************************************
17 REM
20 DEFINT A-W,Z
25 CONESEC=700:PRESSOPT=0
30 OPEN "STUDENT.NAM" FOR INPUT AS #1:INPUT
#1,LASTNAME$,FIRSTNAME$,MAXDOMCP,CDOM,CINDEX,TIT1$:INPUT
#1,TELI$,VIDO$,DRIVDR$,DIRCTDR$,DRIVMO$,DIRCTMO$,DRIVT
S$,DIRCTTS$:CLOSE #1
35 OPEN "testopt.dta" FOR INPUT AS #1:INPUT #1,REVW$:CLOSE #1
40 OPEN TELI$ AS #2:PRINT #2,CHR$(14)"8@@@["CHR$(127)CHR$(127);
50 VIDEO$="DISK"
60 IF VIDEO$<>"OFF" THEN OPEN VIDO$ AS #3          'replace when
assembled
90
PRECONT$=CHR$(16)+CHR$(2)+CHR$(17)+CHR$(36)+CHR$(119):POSTCONT$=CHR$(1
6)+CHR$(3)
170 REM ******************************************************
171 REM *    Variable usage                                    *
172 REM *  a%       - used for branch page pointers           *
173 REM *  numst    - number of brnaches on a page            *
174 REM *  upbnds() - area definitions upper limit            *
175 REM *  lobnds() - area definitions lower limit            *
176 REM *  ribnds() - area definitions right limit            *
177 REM *  lebnds() - area definitions left  limit            *
178 REM *  video$   - Flag for video OFF/TAPE/DISK            *
179 REM *  ix       - cursor pointer x value                  *
180 REM *  iy       - cursor pointer y value                  *
181 REM *  tmvl     - time in seconds for delay               *
182 REM *  a$       - general string input                    *
183 REM *  I        - general used as an index                *
184 REM *  ztm      - used as the timing index                *
185 REM *  CONESEC   - Value for 1 second loop (interp)       *
186 REM *                                                     *
187 REM *                                                     *
188 REM *                                                     *
189 REM *                                                     *
190 REM *                                                     *
191 REM *                                                     *
192 REM *   Note all variables beginning with A-W and         *
193 REM *   Z are integers by definition.                     *
194 REM ******************************************************
195 ON COM(1) GOSUB 65000:COM(1) ON
197 GOTO 2000
```

```
200 REM   Question page reply and branch
210 A$=INKEY$:IF A$="" THEN 210
220 IF A$=CHR$(13) THEN 210
230 A%=VAL(A$):IF A%<1 OR A%>NUMST THEN 210
240 RETURN
250 REM   Sensitive area response and branch
260 GOSUB 64010:I=0:A%=0
265 I=I+1:IF I>NUMST THEN 260
270 IF IY<=UPBNDS(I) AND IY=>LOBNDS(I) AND IX=>LEBNDS(I) AND
IX<=RIBNDS(I) THEN A%=I:RETURN 275 GOTO 265
300 REM   Timed page wait
310 A$=TIME$:A=VAL(MID$(A$,4,2))*60+VAL(RIGHT$(A$,2))
312 B$=TIME$:B=VAL(MID$(B$,4,2))*60+VAL(RIGHT$(B$,2)):IF B-A<TMVL
THEN 312
314 RETURN
320 REM   Press key page wait
325 IF PRESSOPT<>0 THEN BEEP ELSE PRINT
#2,CHR$(14)">x|"CHR$(27)CHR$(76)CHR$(27)"H$@xF"CHR$(15)"Press space
to continue"CHR$(14)CHR$(27)CHR$(73)CHR$(14); 330 A$=INKEY$:IF A$=""
THEN 330
335 IF A$<>" " THEN 330
340 IF PRESSOPT=0 THEN PRINT
#2,CHR$(14)">x|$@xF"CHR$(15)SPACE$(23)CHR$(14);
345 RETURN
350 REM   Wait for video
355 IF VIDEO$="OFF" THEN BEEP:PRINT
#2,CHR$(14)">x|"CHR$(12)"$BxF"CHR$(15)"Logic error Video
off"CHR$(14);:GOTO 62___        'goto the exit to domain menu 360 IF
VIDEO$="DISK" THEN 380   'change when activated
365 GOTO 320  'change when activated
378 REM Wait for program on video disc
379 REM
380 GOSUB 750:PRINT #3,CHR$(103);:FOR I=1 TO 50:NEXT I:GOSUB 750:IF
RIGHT$(FR$,1)=CHR$(10) THEN FR$=LEFT$(FR$,LEN(FR$)-1) 382
C$=LEFT$(RIGHT$(FR$,3),1):C=ASC(C$):IF C<128 THEN RETURN
392 JJ=0:GOSUB 750:FOR IJ=1 TO LEN(FR$):IF MID$(FR$,IJ,1)=CHR$(4) OR
MID$(FR$,IJ,1)=CHR$(1) THEN JJ=1
394 NEXT IJ:IF JJ=0 THEN 392
396 RETURN
400 REM
401 REM   Special SONY functions
402 REM
410 CMTL=48:GOTO 430              'diskplay both halves
412 CMTL=49:GOTO 430              'display only left half
414 CMTL=50:GOTO 430              'display only right half
416 CMTL=64:GOTO 430              'both sides write mode
418 CMTL=65:GOTO 430              'left half write mode
420 CMTL=66:GOTO 430              'right half write mode
422 CMTL=67:GOTO 430              'expand from right half to full display
424 CMTL=68:GOTO 430              'shrink full display to left half
430 PRINT #2,PRECONT$CHR$(CMTL)POSTCONT$;:RETURN  'REM Handle special
finctions 470 CMTL=32:GOTO 430    'REM Handle telidon video
```

```
480 CMTL=33:GOSUB 430:CMTL=34:GOTO 430    'REM Handle video source vid
490 CMTL=33:GOTO 430    'REM Handle both video sourc
500 REM   Position video tape
505 RETURN
600 REM Video disk control
601 REM
610 IF VIDEO$="OFF" THEN BEEP:PRINT
#2,CHR$(14)">x|"CHR$(12)"$BxF"CHR$(15)"Logic error Video
off"CHR$(14);:GOTO 62___        'goto the exit to domain menu
612 IF VDCMD$="STILL" THEN 640
614 IF VDCMD$="USERC" THEN 660
618 REM Play type video disc control
619 REM
620 PRINT #3,INDX$;:FOR IJ=1 TO LEN(VIDEOCMD$):PRINT
#3,MID$(VIDEOCMD$,IJ,1);:FOR JI=1 TO 10:NEXT JI:NEXT IJ:TMVL=0:GOSUB
310:PRINT #3,AUD$"W1X";:RETURN 638 REM Single frame display
639 REM
640 VIDEOCMD$="VC"+FRAME$+"@":PRINT #3,INDX$;:FOR IJ=1 TO
LEN(VIDEOCMD$):PRINT #3,MID$(VIDEOCMD$,IJ,1);:FOR JI=1 TO 10:NEXT
JI:NEXT IJ:RETURN
658 REM User control of player
659 REM
660 FOR IJ=1 TO LEN(VIDEOCMD$):PRINT #3,MID$(VIDEOCMD$,IJ,1);:FOR
JI=1 TO 10:NEXT JI:NEXT IJ:TMVL=3:GOSUB 310:PRINT #3,INDX$;
665 GOSUB 750:PRINT #3,CHR$(96);:FOR I=1 TO 50:NEXT I:GOSUB 750:GOSUB
770:FRNO=VAL(FR$) 670 A$=INKEY$:IF A$<>CHR$(13) AND
A$<>CHR$(0)+CHR$(75) AND A$<>CHR$(0)+CHR$(77) THEN 670 675 IF
A$<>CHR$(13) THEN 700
680 IF FRNO<VAL(VDMATCH$)-VDR2 OR FRNO>VAL(VDMATCH$)+VDR2 THEN
A%=6:GOTO 690
681 IF FRNO<VAL(VDMATCH$)-VDR1 THEN A%=5:GOTO 690
682 IF FRNO>VAL(VDMATCH$)+VDR1 THEN A%=4:GOTO 690
684 IF FRNO<VAL(VDMATCH$) THEN A%=3:GOTO 690
686 IF FRNO>VAL(VDMATCH$) THEN A%=2:GOTO 690
688 IF FRNO=VAL(VDMATCH$) THEN A%=1
690 IF A%<1 OR A%>6 THEN 665
692 IF A%>NUMST THEN 665
694 RETURN
700 IF A$=CHR$(0)+CHR$(75) THEN 730
708 REM advance frame
709 REM
710 IF FRNO+1 >VAL(VDSTOP$) THEN SOUND 80,8:GOTO 670
720 PRINT #3,CHR$(61);:FOR I=1 TO 100:NEXT I:PRINT #3,CHR$(79);:GOTO
665 728 REM reverse frame
729 REM
730 IF FRNO-1 <VAL(VDSTART$) THEN SOUND 80,8:GOTO 670
740 PRINT #3,CHR$(77);:FOR I=1 TO 100:NEXT I:PRINT #3,CHR$(79);:GOTO
665
750 FR$="":LOCATE 2,1
752 WHILE NOT EOF(3)
754       ZB$=INPUT$(LOC(3),#3)
756       FR$=FR$+ZB$
758 WEND:RETURN
```

```
770 A$="":FOR I=1 TO LEN(FR$):IF ASC(MID$(FR$,I,1))>47 AND
ASC(MID$(FR$,I,1))<58 THEN A$=A$+MID$(FR$,I,1) 772 NEXT I:FR$=A$:RETURN
800 REM Please wait
810 PRINT #2,CHR$(14)">x|"CHR$(27)"L"CHR$(34)"@@$HXc"CHR$(15)"Please
wait"CHR$(14);:RETURN
2000 PRINT
#2,CHR$(14)">@<@@@>D<GG@>H<xG@>L<"CHR$(127)"@@>P<IIH>T<rRp>X<dd'>\<"CH
R$(127)CHR$(127)"x>'<mmh>d<[[X>h<iIH>l<SZP>p<T@P>t<RRP>x<vvp>|<HA@>x|"
CHR$ (12)" AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13);
2002 PRINT
#2,CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR
$(10)"          S C H E D U L E
"CHR$(13)CHR$(10)CHR$(14)CHR$ (14)"8@@@["CHR$(127)CHR$(127);
2006 GOSUB 470
2011  TMVL= 5 :GOSUB 310
2016  GOTO 2200
2200
VIDEOCMD$="E001@23912@25015@VW1@:1@@":VDCMD$="NORML":AUD$="FH":INDX$="
Q":GOSUB 600
2205 GOSUB 480
2210  GOSUB 355
2215  GOTO 2400
2400
VIDEOCMD$="E001@25035@25646@VW1@:1@@":VDCMD$="NORML":AUD$="FH":INDX$="
Q":GOSUB 600
2405 GOSUB 480
2410  GOSUB 355
2415  GOTO 2600
2600 PRINT
#2,CHR$(14)">@<@@@>D<GG@>H<xG@>L<"CHR$(127)"@@>P<IIH>T<rRp>X<dd'>\<"CH
R$(127)CHR$(127)"x>'<mmh>d<[[X>h<iIH>l<SZP>p<T@P>t<RRP>x<vvp>|<HA@>x|"
CHR$ (12)" AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13);
2602 PRINT #2,CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)"    A
RUNNING SCHEDULE FOR BEGINNERS
"CHR$(13)CHR$(10)"
    "CHR$(13)CHR$(10)"                    ";
2604 PRINT #2,"                    "CHR$(13)CHR$(10)"Establish a
baseline by jogging until  "CHR$(13)CHR$(10)"fatigued.  Take note of
the distance   "CHR$(1 3)CHR$(10)"covered.  That becomes your base";
2606 PRINT #2,"line   "CHR$(13)CHR$(10)"distance.  Rest by walking
then repeat "CHR$(13)CHR$(10)"for one mile.
"CHR$(13)CHR$(10)CH R$(14)CHR$(14)"8@@@["CHR$(127)CHR$(127);
2610 GOSUB 470
2615  GOSUB 325
2620  GOTO 2800
2800 PRINT #2,CHR$(14)">x|"CHR$(12)"
AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13)CHR$(10)CHR$(10)CHR$(10)CHR$(1
0)CHR$(10)"              PHASE 2
    "CHR$(13)CHR$(10)"                    ";
2802 PRINT #2,"                  "CHR$(13)CHR$(10)"Monday & Friday: 3 x
baseline, walk to "CHR$(13)CHR$(10)"finish one
mile.                    "CHR$(13) CHR$(10)"Wednesday: one mile easy
jogging. ";
```

```
2804 PRINT #2,"     "CHR$(13)CHR$(10)"Other days: rest or long
walk.          "CHR$(13)CHR$(10)"
"CHR$(13)CHR$(10)"Adv ance to Phase 3 when able to jog one"CHR$(13);
2806 PRINT #2,CHR$(10)"mile nonstop.
"CHR$(13)CHR$(10)CHR$(14)CHR$(14)"8@@@["CHR$(127)CHR$(127);
2810 GOSUB 470
2815  GOSUB 325
2820  GOTO 3000
3000 PRINT #2,CHR$(14)">x|"CHR$(12)"
AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13)CHR$(10)CHR$(10)CHR$(10)CHR$
(10)CHR$(10)"                PHASE 3
    "CHR$(13)CHR$(10)"                          ";
3002 PRINT #2,"                  "CHR$(13)CHR$(10)"Monday & Thursday:
3 x half mile jog.  "CHR$(13)CHR$(10)"Tuesday: one mile
jog.                 "CHR$(13) CHR$(10)"Saturday: two mile
jog.          ";
3004 PRINT #2,"     "CHR$(13)CHR$(10)"Other days:
rest.
"CHR$(13)CHR$(10)"
"CHR$(13)CHR$(10)"Adv ance to phase 4 when able to run two"CHR$(13);
3006 PRINT #2,CHR$(10)"miles nonstop.
"CHR$(13)CHR$(10)CHR$(14)CHR$(14)"8@@@["CHR$(127)CHR$(127);
3010 GOSUB 470
3015  GOSUB 325
3020  GOTO 3200
3200 PRINT #2,CHR$(14)">x|"CHR$(12)"
AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13)CHR$(10)CHR$(10)CHR$(10)CHR$
(10)CHR$(10)"                PHASE 4
    "CHR$(13)CHR$(10)"                          ";
3202 PRINT #2,"                  "CHR$(13)CHR$(10)"Monday, Wednesday,
& Saturday: 3 x
"CHR$(13)CHR$(10)"mile.                                    "CHR$(13)
CHR$(10)"Tuesday: two mile jog.          ";
3204 PRINT #2,"     "CHR$(13)CHR$(10)"Friday: 4 x
880.                    "CHR$(13)CHR$(10)"Other days:
rest.                   "CHR$(13)CHR$(10)"
                              "CHR$(13);
3206 PRINT #2,CHR$(10)"Advance to phase 5 when able to run 4
"CHR$(13)CHR$(10)"miles nonstop.
"CHR$(13)CHR$(10)CHR$(14)CHR$(14)"8@ @@["CHR$(127)CHR$(127);
3210 GOSUB 470
3215  GOSUB 325
3220  GOTO 3400
3400 PRINT #2,CHR$(14)">x|"CHR$(12)"
AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13)CHR$(10)CHR$(10)CHR$(10)CHR$
(10)CHR$(10)"                PHASE 5
    "CHR$(13)CHR$(10)"                          ";
3402 PRINT #2,"                  "CHR$(13)CHR$(10)"Monday & Saturday:
4 mile run.         "CHR$(13)CHR$(10)"Tuesday: 4 x mile, rest between
miles. "CHR$(13) CHR$(10)"Wednesday: jog and walk 5 miles.  ";
3404 PRINT #2,"     "CHR$(13)CHR$(10)"Friday: 2 x 2 miles, rest
between      "CHR$(13)CHR$(10)"miles.
"CHR$(13)CHR$(10)"Oth er days: rest.                       "CHR$(13);
```

```
3406 PRINT #2,CHR$(10)"
"CHR$(13)CHR$(10)"Now consider yourself a runner!
"CHR$(13)CHR$(10)CHR$(14)CHR$(14)"8@ @@["CHR$(127)CHR$(127);
3410 GOSUB 470
3415  GOSUB 325
3420  GOTO 62000
62000 REM This is where the module exit processing will take place
62010 GOSUB 470:PRINT
#2,CHR$(14)">x|"CHR$(12)"!H@@[2ZwLeZV!H@@@#@#@"CHR$(27)"L"CHR$(34)"@@"
CHR$(27)"I8@TmZYQ"CHR$(14)">|x#@3@JuZdV>x|"CHR$(27)"L"CHR$(34)" @'";
62020 PRINT #2,CHR$(34)"@@"CHR$(27)"I$JrW"CHR$(15)CHR$(13)CHR$(10);
62022 PRINT #2,"Do you want to review this module?";
62024 PRINT #2,CHR$(13)CHR$(10)CHR$(13)CHR$(10)"
(Y/N)"CHR$(14);
62030 PRINT
#2,">x|$BOr"CHR$(27)CHR$(76)CHR$(15)TIT1$CHR$(14)"8@@@["CHR$(127)CHR$(
127)CHR$(34)"@'";
62050 A$=INKEY$:IF A$<>"Y" AND A$<>"N" AND A$<>"y" AND A$<>"n" THEN
62050
62060 IF A$="Y" OR A$="y" THEN 2000
62100 GOSUB 810:COM (1) OFF:IF REVW$="REVIEWMODE" THEN 62200
62110 IF NXTMOD$="SYSTEM" THEN 62200
62120 RUN DRIVMO$+":"+DIRCTMO$+NXTMOD$
62200 SYSTEM
64000 REM This is where the cursor positioning takes place
64010 RETURN
65000 WHILE NOT EOF(2)
65010 A$="":A$=INPUT$(LOC(2),#2)
65020 IF RIGHT$(A$,1)=CHR$(19) THEN 65100
65025 IF A$=CHR$(19) THEN 65100
65030 IF RIGHT$(A$,1)=CHR$(17) THEN RETURN
65035 IF A$=CHR$(17) THEN RETURN
65040 WEND:RETURN
65100 COM(1) OFF:WHILE NOT EOF(2)
65110 A$=INPUT$(LOC(2),#2):IF A$=CHR$(17) THEN COM(1) ON:RETURN
65120 WEND:GOTO 65100
```

```
5 REM  Module name : D01M03.MOD 6 REM
7 NXTMOD$="D01M04.MOD"
8 REM
10 REM ****************************************
11 REM *  Coursewriter Module Base Driver     *
12 REM *  (Sony decoder & Keyboard version)   *
13 REM *                                      *
14 REM *  Driver release date : 15-OCT-83     *
15 REM *  Driver last modified:               *
16 REM ****************************************
17 REM
20 DEFINT A-W,Z
25 CONESEC=700:PRESSOPT=0
30 OPEN "STUDENT.NAM" FOR INPUT AS #1:INPUT
#1,LASTNAME$,FIRSTNAME$,MAXDOMCP,CDOM,CINDEX,TIT1$:INPUT
#1,TELI$,VIDO$,DRIVDR$,DIRCTDR$,DRIVMO$,DIRCTMO$,DRIVT
S$,DIRCTTS$:CLOSE #1
35 OPEN "testopt.dta" FOR INPUT AS #1:INPUT #1,REVW$:CLOSE #1
40 OPEN TELI$ AS #2:PRINT #2,CHR$(14)"8@@@["CHR$(127)CHR$(127);
50 VIDEO$="DISK"
60 IF VIDEO$<>"OFF" THEN OPEN VIDO$ AS #3              'replace when
assembled
90
PRECONT$=CHR$(16)+CHR$(2)+CHR$(17)+CHR$(36)+CHR$(119):POSTCONT$=CHR$(16)
+CHR$(3)
170 REM ***************************************************
171 REM *    Variable usage                                 *
172 REM *  a%       - used for branch page pointers         *
173 REM *  numst    - number of brnaches on a page          *
174 REM *  upbnds() - area definitions upper limit          *
175 REM *  lobnds() - area definitions lower limit          *
176 REM *  ribnds() - area definitions right limit          *
177 REM *  lebnds() - area definitions left  limit          *
178 REM *  video$   - Flag for video OFF/TAPE/DISK          *
179 REM *  ix       - cursor pointer x value               *
180 REM *  iy       - cursor pointer y value               *
181 REM *  tmvl     - time in seconds for delay            *
182 REM *  a$       - general string input                 *
183 REM *  I        - general used as an index             *
184 REM *  ztm      - used as the timing index             *
185 REM *  CONESEC   - Value for 1 second loop (interp)    *
186 REM *                                                  *
187 REM *                                                  *
188 REM *                                                  *
189 REM *                                                  *
190 REM *                                                  *
191 REM *                                                  *
192 REM *   Note all variables beginning with A-W and      *
193 REM *   Z are integers by definition.                  *
194 REM ***************************************************
195 ON COM(1) GOSUB 65000:COM(1) ON
197 GOTO 2000
```

```
200 REM   Question page reply and branch
210 A$=INKEY$:IF A$="" THEN 210
220 IF A$=CHR$(13) THEN 210
230 A%=VAL(A$):IF A%<1 OR A%>NUMST THEN 210
240 RETURN
250 REM   Sensitive area response and branch
260 GOSUB 64010:I=0:A%=0
265 I=I+1:IF I>NUMST THEN 260
270 IF IY<=UPBNDS(I) AND IY=>LOBNDS(I) AND IX=>LEBNDS(I) AND
IX<=RIBNDS(I) THEN A%=I:RETURN 275 GOTO 265
300 REM   Timed page wait
310 A$=TIME$:A=VAL(MID$(A$,4,2))*60+VAL(RIGHT$(A$,2))
312 B$=TIME$:B=VAL(MID$(B$,4,2))*60+VAL(RIGHT$(B$,2)):IF B-A<TMVL
THEN 312
314 RETURN
320 REM   Press key page wait
325 IF PRESSOPT<>0 THEN BEEP ELSE PRINT
#2,CHR$(14)">x|"CHR$(27)CHR$(76)CHR$(27)"H$@xF"CHR$(15)"Press space
to continue"CHR$(14)CHR$(27)CHR$(73)CHR$(14); 330 A$=INKEY$:IF A$=""
THEN 330
335 IF A$<>" " THEN 330
340 IF PRESSOPT=0 THEN PRINT
#2,CHR$(14)">x|$@xF"CHR$(15)SPACE$(23)CHR$(14);
345 RETURN
350 REM   Wait for video
355 IF VIDEO$="OFF" THEN BEEP:PRINT
#2,CHR$(14)">x|"CHR$(12)"$BxF"CHR$(15)"Logic error Video
off"CHR$(14);:GOTO 62___        'goto the exit to domain menu 360 IF
VIDEO$="DISK" THEN 380   'change when activated
365 GOTO 320  'change when activated
378 REM Wait for program on video disc
379 REM
380 GOSUB 750:PRINT #3,CHR$(103);:FOR I=1 TO 50:NEXT I:GOSUB 750:IF
RIGHT$(FR$,1)=CHR$(1)) THEN FR$=LEFT$(FR$,LEN(FR$)-1) 382
C$=LEFT$(RIGHT$(FR$,2),1):C=ASC(C$):IF C<128 THEN RETURN
392 JJ=0:GOSUB 750:FOR IJ=1 TO LEN(FR$):IF MID$(FR$,IJ,1)=CHR$(4) OR
MID$(FR$,IJ,1)=CHR$(1) THEN JJ=1
394 NEXT IJ:IF JJ=0 THEN 392
396 RETURN
400 REM
401 REM   Special SONY functions
402 REM
410 CMTL=48:GOTO 430            'diskplay both halves
412 CMTL=49:GOTO 430            'display only left half
414 CMTL=50:GOTO 430            'display only right half
416 CMTL=64:GOTO 430            'both sides write mode
418 CMTL=65:GOTO 430            'left half write mode
420 CMTL=66:GOTO 430            'right half write mode
422 CMTL=67:GOTO 430            'expand from right half to full display
424 CMTL=68:GOTO 430            'shrink full display to left half
430 PRINT #2,PRECONT$CHR$(CMTL)POSTCONT$;:RETURN  'REM Handle special
finctions 470 CMTL=32:GOTO 430    'REM Handle telidon video
```

```
480 CMTL=33:GOSUB 430:CMTL=34:GOTO 430     'REM Handle video source vid
490 CMTL=33:GOTO 430     'REM Handle both video sourc
500 REM   Position video tape
505 RETURN
600 REM Video disk control
601 REM
610 IF VIDEO$="OFF" THEN BEEP:PRINT
#2,CHR$(14)">x|"CHR$(12)"$BxF"CHR$(15)"Logic error Video
off"CHR$(14);:GOTO 62___        'goto the exit to domain menu
612 IF VDCMD$="STILL" THEN 640
614 IF VDCMD$="USERC" THEN 660
618 REM Play type video disc control
619 REM
620 PRINT #3,INDX$;:FOR IJ=1 TO LEN(VIDEOCMD$):PRINT
#3,MID$(VIDEOCMD$,IJ,1);:FOR JI=1 TO 10:NEXT JI:NEXT IJ:TMVL=0:GOSUB
310:PRINT #3,AUD$"W1X";:RETURN 638 REM Single frame display
639 REM
640 VIDEOCMD$="VC"+FRAME$+"@":PRINT #3,INDX$;:FOR IJ=1 TO
LEN(VIDEOCMD$):PRINT #3,MID$(VIDEOCMD$,IJ,1);:FOR JI=1 TO 10:NEXT
JI:NEXT IJ:RETURN
658 REM User control of player
659 REM
660 FOR IJ=1 TO LEN(VIDEOCMD$):PRINT #3,MID$(VIDEOCMD$,IJ,1);:FOR
JI=1 TO 10:NEXT JI:NEXT IJ:TMVL=3:GOSUB 310:PRINT #3,INDX$;
665 GOSUB 750:PRINT #3,CHR$(96);:FOR I=1 TO 50:NEXT I;GOSUB 750:GOSUB
770:FRNO=VAL(FR$) 670 A$=INKEY$:IF A$<>CHR$(13) AND
A$<>CHR$(0)+CHR$(75) AND A$<>CHR$(0)+CHR$(77) THEN 670 675 IF
A$<>CHR$(13) THEN 700
680 IF FRNO<VAL(VDMATCH$)-VDR2 OR FRNO>VAL(VDMATCH$)+VDR2 THEN
A%=6:GOTO 690
681 IF FRNO<VAL(VDMATCH$)-VDR1 THEN A%=5:GOTO 690
682 IF FRNO>VAL(VDMATCH$)+VDR1 THEN A%=4:GOTO 690
684 IF FRNO<VAL(VDMATCH$) THEN A%=3:GOTO 690
686 IF FRNO>VAL(VDMATCH$) THEN A%=2:GOTO 690
688 IF FRNO=VAL(VDMATCH$) THEN A%=1
690 IF A%<1 OR A%>6 THEN 665
692 IF A%>NUMST THEN 665
694 RETURN
700 IF A$=CHR$(0)+CHR$(75) THEN 730
708 REM advance frame
709 REM
710 IF FRNO+1 >VAL(VDSTOP$) THEN SOUND 80,8:GOTO 670
720 PRINT #3,CHR$(61);:FOR I=1 TO 100:NEXT I:PRINT #3,CHR$(79);:GOTO
665 728 REM reverse frame
729 REM
730 IF FRNO-1 <VAL(VDSTART$) THEN SOUND 80,8:GOTO 670
740 PRINT #3,CHR$(77);:FOR I=1 TO 100:NEXT I:PRINT #3,CHR$(79);:GOTO
665
750 FR$="":LOCATE 2,1
752 WHILE NOT EOF(3)
754       ZB$=INPUT$(LOC(3),#3)
756       FR$=FR$+ZB$
758 WEND:RETURN
```

```
770 A$="":FOR I=1 TO LEN(FR$):IF ASC(MID$(FR$,I,1))>47 AND
ASC(MID$(FR$,I,1))<58 THEN A$=A$+MID$(FR$,I,1) 772 NEXT I:FR$=A$:RETURN
800 REM Please wait
810 PRINT #2,CHR$(14)">x|"CHR$(27)"L"CHR$(34)"@@$HXc"CHR$(15)"Please
wait"CHR$(14);:RETURN
2000 PRINT
#2,CHR$(14)">@<@@@>D<GG@>H<xC@>L<"CHR$(127)"@@>P<IIH>T<rRp>X<dd'>\<"CH
R$(127)CHR$(127)"x>'<mmh>d<[¡X>h<iIH>l<SZP>p<T@P>t<RRP>x<vvp>|<HA@>x|"
CHR$ (12)" AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13);
2002 PRINT
#2,CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR
$(10)"              B O R E D O M
"CHR$(13)CHR$(10)CHR$(14)CHR$ (14)"8@@@["CHR$(127)CHR$(127);
2006 GOSUB 470
2011  TMVL= 5 :GOSUB 310
2016  GOTO 2200
2200
VIDEOCMD$="E001@05250@07975@VW1@:1@@":VDCMD$="NORML":AUD$="FH":INDX$="
Q":GOSUB 600
2205 GOSUB 480
2210  GOSUB 355
2215  GOTO 62000
62000 REM This is where the module exit processing will take place
62010 GOSUB 470:PRINT
#2,CHR$(14)">x|"CHR$(12)"!H@@[2ZwLeZV!H@@@*@*@"CHR$(27)"L"CHR$(34)"@@"
CHR$(27)"I8@TmZYQ"CHR$(14)">|x*@3@JuZdV>x|"CHR$(27)"L"CHR$(34)" @'";
62020 PRINT #2,CHR$(34)"@@"CHR$(27)"I$JrW"CHR$(15)CHR$(13)CHR$(10);
62022 PRINT #2,"Do you want to review this module?";
62024 PRINT #2,CHR$(13)CHR$(10)CHR$(13)CHR$(10)"
(Y/N)"CHR$(14);
62030 PRINT
#2,">x|$BOr"CHR$(27)CHR$(76)CHR$(15)TIT1$CHR$(14)"8@@@["CHR$(127)CHR$(
127)CHR$(34)"@'";
62050 A$=INKEY$:IF A$<>"Y" AND A$<>"N" AND A$<>"y" AND A$<>"n" THEN
62050
62060 IF A$="Y" OR A$="y" THEN 2000
62100 GOSUB 810:COM (1) OFF:IF REVW$="REVIEWMODE" THEN 62200
62110 IF NXTMOD$="SYSTEM" THEN 62200
62120 RUN DRIVMO$+":"+DIRCTMO$+NXTMOD$
62200 SYSTEM
64000 REM This is where the cursor positioning takes place
64010 RETURN
65000 WHILE NOT EOF(2)
65010 A$="":A$=INPUT$(LOC(2),#2)
65020 IF RIGHT$(A$,1)=CHR$(19) THEN 65100
65025 IF A$=CHR$(19) THEN 65100
65030 IF RIGHT$(A$,1)=CHR$(17) THEN RETURN
65035 IF A$=CHR$(17) THEN RETURN
65040 WEND:RETURN
65100 COM(1) OFF:WHILE NOT EOF(2)
65110 A$=INPUT$(LOC(2),#2):IF A$=CHR$(17) THEN COM(1) ON:RETURN
65120 WEND:GOTO 65100
```

```
5 REM  Module name : D01M04.MOD 6 REM
7 NXTMOD$="SYSTEM"
8 REM
10 REM ****************************************
11 REM *  Coursewriter Module Base Driver     *
12 REM *  (Sony decoder & Keyboard version)   *
13 REM *                                      *
14 REM *  Driver release date : 15-OCT-83     *
15 REM *  Driver last modified:               *
16 REM ****************************************
17 REM
20 DEFINT A-W,Z
25 CONESEC=700:PRESSOPT=0
30 OPEN "STUDENT.NAM" FOR INPUT AS #1:INPUT
#1,LASTNAME$,FIRSTNAME$,MAXDOMCP,CDOM,CINDEX,TIT1$:INPUT
#1,TELI$,VIDO$,DRIVDR$,DIRCTDR$,DRIVMO$,DIRCTMO$,DRIVT
S$,DIRCTTS$:CLOSE #1
35 OPEN "testopt.dta" FOR INPUT AS #1:INPUT #1,REVW$:CLOSE #1
40 OPEN TELI$ AS #2:PRINT #2,CHR$(14)"8@@@["CHR$(127)CHR$(127);
50 VIDEO$="DISK"
60 IF VIDEO$<>"OFF" THEN OPEN VIDO$ AS #3              'replace when
assembled
90
PRECONT$=CHR$(16)+CHR$(2)+CHR$(17)+CHR$(36)+CHR$(119):POSTCONT$=CHR$(1
6)+CHR$(3)
170 REM ******************************************************
171 REM *    Variable usage                                    *
172 REM *  a%        - used for branch page pointers           *
173 REM *  numst     - number of brnaches on a page            *
174 REM *  upbnds()  - area definitions upper limit            *
175 REM *  lobnds()  - area definitions lower limit            *
176 REM *  ribnds()  - area definitions right limit            *
177 REM *  lebnds()  - area definitions left  limit            *
178 REM *  video$    - Flag for video OFF/TAPE/DISK            *
179 REM *  ix        - cursor pointer x value                  *
180 REM *  iy        - cursor pointer y value                  *
181 REM *  tmvl      - time in seconds for delay               *
182 REM *  a$        - general string input                    *
183 REM *  I         - general used as an index                *
184 REM *  stm       - used as the timing index                *
185 REM *  CONESEC    - Value for 1 second loop (interp)       *
186 REM *                                                      *
187 REM *                                                      *
188 REM *                                                      *
189 REM *                                                      *
190 REM *                                                      *
191 REM *                                                      *
192 REM *   Note all variables beginning with A-W and          *
193 REM *   Z are integers by definition.                      *
194 REM ******************************************************
195 ON COM(1) GOSUB 65000:COM(1) ON
197 GOTO 2000
```

```
200 REM   Question page reply and branch
210 A$=INKEY$:IF A$="" THEN 210
220 IF A$=CHR$(13) THEN 210
230 A%=VAL(A$):IF A%<1 OR A%>NUMST THEN 210
240 RETURN
250 REM   Sensitive area response and branch
260 GOSUB 64010:I=0:A%=0
265 I=I+1:IF I>NUMST THEN 260
270 IF IY<=UPBNDS(I) AND IY=>LOBNDS(I) AND IX=>LEBNDS(I) AND
IX<=RIBNDS(I) THEN A%=I:RETURN 275 GOTO 265
300 REM   Timed page wait
310 A$=TIME$:A=VAL(MID$(A$,4,2))*60+VAL(RIGHT$(A$,2))
312 B$=TIME$:B=VAL(MID$(B$,4,2))*60+VAL(RIGHT$(B$,2)):IF B-A<TMVL
THEN 312
314 RETURN
320 REM   Press key page wait
325 IF PRESSOPT<>0 THEN BEEP ELSE PRINT
#2,CHR$(14)">x|"CHR$(27)CHR$(76)CHR$(27)"H$@xF"CHR$(15)"Press space
to continue"CHR$(14)CHR$(27)CHR$(73)CHR$(14); 330 A$=INKEY$:IF A$=""
THEN 330
335 IF A$<>" " THEN 330
340 IF PRESSOPT=0 THEN PRINT
#2,CHR$(14)">x|$@xF"CHR$(15)SPACE$(23)CHR$(14);
345 RETURN
350 REM   Wait for video
355 IF VIDEO$="OFF" THEN BEEP:PRINT
#2,CHR$(14)">x|"CHR$(12)"$BxF"CHR$(15)"Logic error Video
off"CHR$(14);:GOTO 62___        'goto the exit to domain menu 360 IF
VIDEO$="DISK" THEN 380    'change when activated
365 GOTO 320  'change when activated
378 REM Wait for program on video disc
379 REM
380 GOSUB 750:PRINT #3,CHR$(103);:FOR I=1 TO 50:NEXT I:GOSUB 750:IF
RIGHT$(FR$,1)=CHR$(10) THEN FR$=LEFT$(FR$,LEN(FR$)-1) 382
C$=LEFT$(RIGHT$(FR$,3),1):C=ASC(C$):IF C<128 THEN RETURN
392 JJ=0:GOSUB 750:FOR IJ=1 TO LEN(FR$):IF MID$(FR$,IJ,1)=CHR$(4) OR
MID$(FR$,IJ,1)=CHR$(1) THEN JJ=1
394 NEXT IJ:IF JJ=0 THEN 392
396 RETURN
400 REM
401 REM   Special SONY functions
402 REM
410 CMTL=48:GOTO 430              'diskplay both halves
412 CMTL=49:GOTO 430              'display only left half
414 CMTL=50:GOTO 430              'display only right half
416 CMTL=64:GOTO 430              'both sides write mode
418 CMTL=65:GOTO 430              'left half write mode
420 CMTL=66:GOTO 430              'right half write mode
422 CMTL=67:GOTO 430              'expand from right half to full display
424 CMTL=68:GOTO 430              'shrink full display to left half
430 PRINT #2,PRECONT$CHR$(CMTL)POSTCONT$;:RETURN  'REM Handle special
finctions 470 CMTL=32:GOTO 430    'REM Handle telidon video
```

```
480 CMTL=33:GOSUB 430:CMTL=34:GOTO 430    'REM Handle video source vid
490 CMTL=33:GOTO 430    'REM Handle both video sourc
500 REM   Position video tape
505 RETURN
600 REM Video disk control
601 REM
610 IF VIDEO$="OFF" THEN BEEP:PRINT
#2,CHR$(14)">x|"CHR$(12)"$BxF"CHR$(15)"Logic error Video
off"CHR$(14);:GOTO 62___        'goto the exit to domain menu
612 IF VDCMD$="STILL" THEN 640
614 IF VDCMD$="USERC" THEN 660
618 REM Play type video disc control
619 REM
620 PRINT #3,INDX$;:FOR IJ=1 TO LEN(VIDEOCMD$):PRINT
#3,MID$(VIDEOCMD$,IJ,1);:FOR JI=1 TO 10:NEXT JI:NEXT IJ:TMVL=0:GOSUB
310:PRINT #3,AUD$"W1X";:RETURN 638 REM Single frame display
639 REM
640 VIDEOCMD$="VC"+FRAME$+"@":PRINT #3,INDX$;:FOR IJ=1 TO
LEN(VIDEOCMD$):PRINT #3,MID$(VIDEOCMD$,IJ,1);:FOR JI=1 TO 10:NEXT
JI:NEXT IJ:RETURN
658 REM User control of player
659 REM
660 FOR IJ=1 TO LEN(VIDEOCMD$):PRINT #3,MID$(VIDEOCMD$,IJ,1);:FOR
JI=1 TO 10:NEXT JI:NEXT IJ:TMVL=3:GOSUB 310:PRINT #3,INDX$;
665 GOSUB 750:PRINT #3,CHR$(96);:FOR I=1 TO 50:NEXT I:GOSUB 750:GOSUB
770:FRNO=VAL(FR$) 670 A$=INKEY$:IF A$<>CHR$(13) AND
A$<>CHR$(0)+CHR$(75) AND A$<>CHR$(0)+CHR$(77) THEN 670 675 IF
A$<>CHR$(13) THEN 700
680 IF FRNO<VAL(VDMATCH$)-VDR2 OR FRNO>VAL(VDMATCH$)+VDR2 THEN
A%=6:GOTO 690
681 IF FRNO<VAL(VDMATCH$)-VDR1 THEN A%=5:GOTO 690
682 IF FRNO>VAL(VDMATCH$)+VDR1 THEN A%=4:GOTO 690
684 IF FRNO<VAL(VDMATCH$) THEN A%=3:GOTO 690
686 IF FRNO>VAL(VDMATCH$) THEN A%=2:GOTO 690
688 IF FRNO=VAL(VDMATCH$) THEN A%=1
690 IF A%<1 OR A%>6 THEN 665
692 IF A%>NUMST THEN 665
694 RETURN
700 IF A$=CHR$(0)+CHR$(75) THEN 730
708 REM advance frame
709 REM
710 IF FRNO+1 >VAL(VDSTOP$) THEN SOUND 80,8:GOTO 670
720 PRINT #3,CHR$(61);:FOR I=1 TO 100:NEXT I:PRINT #3,CHR$(79);:GOTO
665 728 REM reverse frame
729 REM
730 IF FRNO-1 <VAL(VDSTART$) THEN SOUND 80,8:GOTO 670
740 PRINT #3,CHR$(77);:FOR I=1 TO 100:NEXT I:PRINT #3,CHR$(79);:GOTO
665
750 FR$="":LOCATE 2,1
752 WHILE NOT EOF(3)
754       ZB$=INPUT$(LOC(3),#3)
756       FR$=FR$+ZB$
758 WEND:RETURN
```

```
770 A$="":FOR I=1 TO LEN(FR$):IF ASC(MID$(FR$,I,1))>47 AND
ASC(MID$(FR$,I,1))<58 THEN A$=A$+MID$(FR$,I,1) 772 NEXT
I:FR$=A$:RETURN
800 REM Please wait
810 PRINT #2,CHR$(14)">x|"CHR$(27)"L"CHR$(34)"@@$HXc"CHR$(15)"Please
wait"CHR$(14);:RETURN
2000 PRINT
#2,CHR$(14)">@<@@@>D<GG@>H<xG@>L<"CHR$(127)"@@>P<IIH>T<rRp>X<dd'>\<"CH
R$(127)CHR$(127)"x>'<mmh>d<[[X>h<iIH>1<SZP>p<T@P>t<RRP>x<vvp>|<HA@>x|"
CHR$ (12)" AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13);
2002 PRINT
#2,CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR
$(10)"        R E F I N E M E N T S
"CHR$(13)CHR$(10)CHR$(14)CHR$ (14)"8@@@["CHR$(127)CHR$(127);
2006 GOSUB 470
2011  TMVL= 5 :GOSUB 310
2016  GOTO 2200
2200
VIDEOCMD$="E001@25660@32571@VW1@:1@@":VDCMD$="NORML":AUD$="FH":INDX$="
Q":GOSUB 600
2205 GOSUB 480
2210  GOSUB 355
2215  GOTO 62000
62000 REM This is where the module exit processing will take place
62010 GOSUB 470:PRINT
#2,CHR$(14)">x|"CHR$(12)"!H@@[2ZwLeZV!H@@@#@#@"CHR$(27)"L"CHR$(34)"@@"
CHR$(27)"I8@TmZYQ"CHR$(14)">|x#@3@JuZdV>x|"CHR$(27)"L"CHR$(34)" @'";
62020 PRINT #2,CHR$(34)"@@"CHR$(27)"I$JrW"CHR$(15)CHR$(13)CHR$(10);
62022 PRINT #2,"Do you want to review this module?";
62024 PRINT #2,CHR$(13)CHR$(10)CHR$(13)CHR$(10)"
(Y/N)"CHR$(14);
62030 PRINT
#2,">x|$BOr"CHR$(27)CHR$(76)CHR$(15)TIT1$CHR$(14)"8@@@["CHR$(127)CHR$(
127)CHR$(34)"@'";
62050 A$=INKEY$:IF A$<>"Y" AND A$<>"N" AND A$<>"y" AND A$<>"n" THEN
62050
62060 IF A$="Y" OR A$="y" THEN 2000
62100 GOSUB 810:COM (1) OFF:IF REVW$="REVIEWMODE" THEN 62200
62110 IF NXTMOD$="SYSTEM" THEN 62200
62120 RUN DRIVMO$+":"+DIRCTMO$+NXTMOD$
62200 SYSTEM
64000 REM This is where the cursor positioning takes place
64010 RETURN
65000 WHILE NOT EOF(2)
65010 A$="":A$=INPUT$(LOC(2),#2)
65020 IF RIGHT$(A$,1)=CHR$(19) THEN 65100
65025 IF A$=CHR$(19) THEN 65100
65030 IF RIGHT$(A$,1)=CHR$(17) THEN RETURN
65035 IF A$=CHR$(17) THEN RETURN
65040 WEND:RETURN
65100 COM(1) OFF:WHILE NOT EOF(2)
65110 A$=INPUT$(LOC(2),#2):IF A$=CHR$(17) THEN COM(1) ON:RETURN
65120 WEND:GOTO 65100
```

```
5 REM  Module name : D02M01.MOD 6 REM
7 NXTMOD$="SYSTEM"
8 REM
10 REM ****************************************
11 REM *  Coursewriter Module Base Driver     *
12 REM *  (Sony decoder & Keyboard version)   *
13 REM *                                      *
14 REM *  Driver release date : 15-OCT-83     *
15 REM *  Driver last modified:               *
16 REM ****************************************
17 REM
20 DEFINT A-W,Z
25 CONESEC=700:PRESSOPT=0
30 OPEN "STUDENT.NAM" FOR INPUT AS #1:INPUT
#1,LASTNAME$,FIRSTNAME$,MAXDOMCP,CDOM,CINDEX,TIT1$:INPUT
#1,TELI$,VIDO$,DRIVDR$,DIRCTDR$,DRIVMO$,DIRCTMO$,DRIVT
S$,DIRCTTS$:CLOSE #1
35 OPEN "testopt.dta" FOR INPUT AS #1:INPUT #1,REVW$:CLOSE #1
40 OPEN TELI$ AS #2:PRINT #2,CHR$(14)"8@@@["CHR$(127)CHR$(127);
50 VIDEO$="DISK"
60 IF VIDEO$<>"OFF" THEN OPEN VIDO$ AS #3              'replace when
assembled
90
PRECONT$=CHR$(16)+CHR$(2)+CHR$(17)+CHR$(36)+CHR$(119):POSTCONT$=CHR$(1
6)+CHR$(3)
170 REM ***************************************************
171 REM *    Variable usage                                 *
172 REM *  a%        - used for branch page pointers        *
173 REM *  numst     - number of brnaches on a page         *
174 REM *  upbnds()  - area definitions upper limit         *
175 REM *  lobnds()  - area definitions lower limit         *
176 REM *  ribnds()  - area definitions right limit         *
177 REM *  lebnds()  - area definitions left  limit         *
178 REM *  video$    - Flag for video OFF/TAPE/DISK         *
179 REM *  ix        - cursor pointer x value               *
180 REM *  iy        - cursor pointer y value               *
181 REM *  tmvl      - time in seconds for delay            *
182 REM *  a$        - general string input                 *
183 REM *  I         - general used as an index             *
184 REM *  ztm       - used as the timing index             *
185 REM *  CONESEC    - Value for 1 second loop (interp)    *
186 REM *                                                   *
187 REM *                                                   *
188 REM *                                                   *
189 REM *                                                   *
190 REM *                                                   *
191 REM *                                                   *
192 REM *   Note all variables beginning with A-W and       *
193 REM *   Z are integers by definition.                   *
194 REM ***************************************************
195 ON COM(1) GOSUB 65000:COM(1) ON
197 GOTO 2000
```

```
200 REM   Question page reply and branch
210 A$=INKEY$:IF A$="" THEN 210
220 IF A$=CHR$(13) THEN 210
230 A%=VAL(A$):IF A%<1 OR A%>NUMST THEN 210
240 RETURN
250 REM   Sensitive area response and branch
260 GOSUB 64010:I=0:A%=0
265 I=I+1:IF I>NUMST THEN 260
270 IF IY<=UPBNDS(I) AND IY=>LOBNDS(I) AND IX=>LEBNDS(I) AND
IX<=RIBNDS(I) THEN A%=I:RETURN 275 GOTO 265
300 REM   Timed page wait
310 A$=TIME$:A=VAL(MID$(A$,4,2))*60+VAL(RIGHT$(A$,2))
312 B$=TIME$:B=VAL(MID$(B$,4,2))*60+VAL(RIGHT$(B$,2)):IF B-A<TMVL
THEN 312
314 RETURN
320 REM   Press key page wait
325 IF PRESSOPT<>0 THEN BEEP ELSE PRINT
#2,CHR$(14)">x|"CHR$(27)CHR$(76)CHR$(27)"H$@xF"CHR$(15)"Press space
to continue"CHR$(14)CHR$(27)CHR$(73)CHR$(14); 330 A$=INKEY$:IF A$=""
THEN 330
335 IF A$<>" " THEN 330
340 IF PRESSOPT=0 THEN PRINT
#2,CHR$(14)">x|$@xF"CHR$(15)SPACE$(23)CHR$(14);
345 RETURN
350 REM   Wait for video
355 IF VIDEO$="OFF" THEN BEEP:PRINT
#2,CHR$(14)">x|"CHR$(12)"$BxF"CHR$(15)"Logic error Video
off"CHR$(14);:GOTO 62___        'goto the exit to domain menu 360 IF
VIDEO$="DISK" THEN 380   'change when activated
365 GOTO 320  'change when activated
378 REM Wait for program on video disc
379 REM
380 GOSUB 750:PRINT #3,CHR$(103);:FOR I=1 TO 50:NEXT I:GOSUB 750:IF
RIGHT$(FR$,1)=CHR$(10) THEN FR$=LEFT$(FR$,LEN(FR$)-1) 382
C$=LEFT$(RIGHT$(FR$,3),1):C=ASC(C$):IF C<128 THEN RETURN
392 JJ=0:GOSUB 750:FOR IJ=1 TO LEN(FR$):IF MID$(FR$,IJ,1)=CHR$(4) OR
MID$(FR$,IJ,1)=CHR$(1) THEN JJ=1
394 NEXT IJ:IF JJ=0 THEN 392
396 RETURN
400 REM
401 REM   Special SONY functions
402 REM
410 CMTL=48:GOTO 430            'diskplay both halves
412 CMTL=49:GOTO 430            'display only left half
414 CMTL=50:GOTO 430            'display only right half
416 CMTL=64:GOTO 430            'both sides write mode
418 CMTL=65:GOTO 430            'left half write mode
420 CMTL=66:GOTO 430            'right half write mode
422 CMTL=67:GOTO 430            'expand from right half to full display
424 CMTL=68:GOTO 430            'shrink full display to left half
```

```
430 PRINT #2,PRECONT$CHR$(CMTL)POSTCONT$;:RETURN  'REM Handle special
finctions 470 CMTL=32:GOTO 430     'REM Handle telidon video
480 CMTL=33:GOSUB 430:CMTL=34:GOTO 430     'REM Handle video source vid
490 CMTL=33:GOTO 430     'REM Handle both video sourc
500 REM   Position video tape
505 RETURN
600 REM Video disk control
601 REM
610 IF VIDEO$="OFF" THEN BEEP:PRINT
#2,CHR$(14)">x|"CHR$(12)"$BxF"CHR$(15)"Logic error Video
off"CHR$(14);:GOTO 62___        'goto the exit to domain menu
612 IF VDCMD$="STILL" THEN 640
614 IF VDCMD$="USERC" THEN 660
618 REM Play type video disc control
619 REM
620 PRINT #3,INDX$;:FOR IJ=1 TO LEN(VIDEOCMD$):PRINT
#3,MID$(VIDEOCMD$,IJ,1);:FOR JI=1 TO 10:NEXT JI:NEXT IJ:TMVL=0:GOSUB
310:PRINT #3,AUD$"W1X";:RETURN 638 REM Single frame display
639 REM
640 VIDEOCMD$="VC"+FRAME$+"@":PRINT #3,INDX$;:FOR IJ=1 TO
LEN(VIDEOCMD$):PRINT #3,MID$(VIDEOCMD$,IJ,1);:FOR JI=1 TO 10:NEXT
JI:NEXT IJ:RETURN
658 REM User control of player
659 REM
660 FOR IJ=1 TO LEN(VIDEOCMD$):PRINT #3,MID$(VIDEOCMD$,IJ,1);:FOR
JI=1 TO 10:NEXT JI:NEXT IJ:TMVL=3:GOSUB 310:PRINT #3,INDX$;
665 GOSUB 750:PRINT #3,CHR$(96);:FOR I=1 TO 50:NEXT I:GOSUB 750:GOSUB
770:FRNO=VAL(FR$) 670 A$=INKEY$:IF A$<>CHR$(13) AND
A$<>CHR$(0)+CHR$(75) AND A$<>CHR$(0)+CHR$(77) THEN 670 675 IF
A$<>CHR$(13) THEN 700
680 IF FRNO<VAL(VDMATCH$)-VDR2 OR FRNO>VAL(VDMATCH$)+VDR2 THEN
A%=6:GOTO 690
681 IF FRNO<VAL(VDMATCH$)-VDR1 THEN A%=5:GOTO 690
682 IF FRNO>VAL(VDMATCH$)+VDR1 THEN A%=4:GOTO 690
684 IF FRNO<VAL(VDMATCH$) THEN A%=3:GOTO 690
686 IF FRNO>VAL(VDMATCH$) THEN A%=2:GOTO 690
688 IF FRNO=VAL(VDMATCH$) THEN A%=1
690 IF A%<1 OR A%>6 THEN 665
692 IF A%>NUMST THEN 665
694 RETURN
700 IF A$=CHR$(0)+CHR$(75) THEN 730
708 REM advance frame
709 REM
710 IF FRNO+1 >VAL(VDSTOP$) THEN SOUND 80,8:GOTO 670
720 PRINT #3,CHR$(61);:FOR I=1 TO 100:NEXT I:PRINT #3,CHR$(79);:GOTO
665 728 REM reverse frame
729 REM
730 IF FRNO-1 <VAL(VDSTART$) THEN SOUND 80,8:GOTO 670
740 PRINT #3,CHR$(77);:FOR I=1 TO 100:NEXT I:PRINT #3,CHR$(79);:GOTO
665
750 FR$="":LOCATE 2,1
752 WHILE NOT EOF(3)
754       ZB$=INPUT$(LOC(3),#3)
756       FR$=FR$+ZB$
758 WEND:RETURN
```

```
770 A$="":FOR I=1 TO LEN(FR$):IF ASC(MID$(FR$,I,1))>47 AND
ASC(MID$(FR$,I,1))<58 THEN A$=A$+MID$(FR$,I,1) 772 NEXT I:FR$=A$:RETURN
800 REM Please wait
810 PRINT #2,CHR$(14)">x|"CHR$(27)"L"CHR$(34)"@@$HXc"CHR$(15)"Please
wait"CHR$(14);:RETURN
2000 PRINT
#2,CHR$(14)">@<@@@>D<GG@>H<xG@>L<"CHR$(127)"@@>P<IIH>T<rRp>X<dd'>\<"CH
R$(127)CHR$(127)"x>'<mmh>d<[[X>h<iIH>l<SZP>p<T@P>t<RRP>x<vvp>|<HA@>x|"
CHR$ (12)CHR$(27)"K"CHR$(34)"@@$Ide"CHR$(15)"Injuries";
2002 PRINT #2,CHR$(14)">t"CHR$(34)"@@$Id\"CHR$(15)"Injuries"CHR$(14);
2006 GOSUB 470
2011  TMVL= 5 :GOSUB 310
2016  GOTO 2200
2200 PRINT
#2,CHR$(14)">@<@@@>D<GG@>H<xG@>L<"CHR$(127)"@@>P<IIH>T<rRp>X<dd'>\<"CH
R$(127)CHR$(127)"x>'<mmh>d<[[X>h<iIH>l<SZP>p<T@P>t<RRP>x<vvp>|<HA@>x|"
CHR$ (12)" AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13);
2202 PRINT
#2,CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)"INJURIES consists
of 3 modules which   "CHR$(13)CHR$(10)"run simultaneously.  The
modules ar e:  "CHR$(13)CHR$(10)"                    ";
2204 PRINT #2,"                    "CHR$(13)CHR$(10)"1.
Foot
"CHR$(13)CHR$(10)"                                          "CHR$(1
3)CHR$(10)"2.  Leg                          ";
2206 PRINT #2,"
"CHR$(13)CHR$(10)"
"CHR$(13)CHR$(10)"3.  Knee
"CHR$(13)CHR$(10)CH R$(14)CHR$(14)"8@@@["CHR$(127)CHR$(127);
2210 GOSUB 470
2215  GOSUB 325
2220  GOTO 2400
2400 PRINT #2,CHR$(14)">x|"CHR$(12)"
AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13)CHR$(10)CHR$(10)CHR$(10)CHR$
(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)"
          F O O T                  "CHR$(13);
2402 PRINT #2,CHR$(10)CHR$(14)CHR$(14)"8@@@["CHR$(127)CHR$(127);
2406 GOSUB 470
2411  TMVL= 5 :GOSUB 310
2416  GOTO 2600
2600 PRINT #2,CHR$(14)">x|"CHR$(12)"
AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13)CHR$(10)CHR$(10)CHR$(10)CHR$
(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)"
      DR. JOHN PAGLIANO            "CHR$(13);
2602 PRINT #2,CHR$(10)CHR$(14)CHR$(14)"8@@@["CHR$(127)CHR$(127);
2606 GOSUB 470
2611  TMVL= 5 :GOSUB 310
2616  GOTO 2800
2800
VIDEOCMD$="E001@10414@13591@VW1@:1@@":VDCMD$="NORML":AUD$="FH":INDX$="
Q":GOSUB 600
2805 GOSUB 480
2810  GOSUB 355
2815  GOTO 3000
```

```
3000 PRINT
#2,CHR$(31)"@@á..íàáàèƒáúááááVáááƒáVá°áƒàVúááƒáVú°áƒÅV°ááƒÅV°°áƒÄV.ááƒÉV
.°áƒVèàáƒdV1ÃáƒÒVÖÅáƒšVøÅáƒÞV–ÞÁƒ VÁƒ°VšáƒªVÕÒáƒÉà°áááÜ°.ƒáVáááƒáVá°
 áƒàVúááƒáVú°áƒÅV°ááƒÅV°°áƒÄV.ááƒÉV.°áƒV";
3002 PRINT
#2,"èàáƒdV1ÃáƒÒVÖÅáƒšVøÅáƒÞV–ÞÁƒ VÁƒ°VšáƒªVÕÒáÑÍàááèúáƒáñÅí..–°°°..–
°°°..–°°Þúúú°°°..–°°à°°ááê°° °°Òúúú°°Ä..–úúú.. °°Åúúú°°°ááê°ÒÞúúú°°úúú
 °°Þ..–úúúúúÏáááàúúúáááÅúúúáàÒúúóáááÃáááááÞa";
3004 PRINT
#2,"áááá°áááááàúúúáááÅáááááÃúúúáááÅáááááÞúúúáááÅáááááàúúúáááÅáááêúúúáááÅáááêúúú
áàÃúúúáááÃáááêáàúúú°°Òáááê°°Þúúú°°°ááê°°Þúúú°°°ááê°°Þúúú°°Òáááê°°Þúúú°°°ááê
 °ÞÃáááê°°Þúúú°°Äúúú°°Åúúúáááê°°Þúúú°Þàúúú°";
3006 PRINT
#2,"Þàúúú°°Òúúú°ÞÃáááê°°Òáááê°°Þ°° ááê°° ááá°°°ááô°°°ááû°°°ááû°°°ááá°°°ááô
ááàáàáàáàáàûáàáàáàûáàáàáàôáàáàáàôáàáàáàûáàÜáàáàáÅáàáàáÃúúúáàÒúúúáàÞáàáàáàáàê
 ááàáàáàáÅáàáêúúú°°°..–°°Òúúú°°Þ..–°°Òúúó°";
3008 PRINT
#2,"°°°..–úúôáàÅáàØáàê°°°ááôúúúáàáÃáàô°°°ááàúúóáàÃáàô°°°ááàúúúúúø°°°..–úúú
áààúúá°°ÞúúéáàáúúóáàáàáàÜáàÅáàêúúéáàáÃáàØáàôúúóáàáàáàØáàÅáàô°°°ááàáàôáàáàáØ
 úúóáàÅ°°ÞúúáàáàúúóúúøáàáàúúáàáÃáàôúúéáàáà";
3010 PRINT
#2,"áØáàô°°°ááàáàêúúúáàáàáàØáàá°°°úúó°°ÒúúóáàáàôáàôúúúáàáàáÅáàêáàáÃáàêúúúáàá°°°
úúú°°Þúúéáàáàôáàáñè ááÃáàô°°°ááàáàô°°°ááàúúáàáàÅáàó°°ÞáàÅáàôáàØáàêáàáàáàûáà
 Üàáê°°°ááô°°Þúúúáêê°°°ááàáàé°°°ááêáàáàáô";
3012 PRINT
#2,"áàúúáàáàáàúúôáàáàúúóáàáàúúóáàáàúúéáàáàúúá°°°úúéúúÏúúú°°°úúóúúøáàáàúúúáàÅáà
êáàÃáàáàáàáÃúúúáàáÃúúóáàáàáàØúúúáàáÅáàêáàáàáàúúúáàáÅúúøáàáÃáàêúúúáàáàáàúúú°°Þúúóáàá°°
 °úúóáàáàúúéáàáÃáàá°°°ááêáàáàáàêáàáÃúúúáàáÅúúú";
3014 PRINT
#2,"àáÃúúøáàáÅúúúáàáÅúúó°°°úúóáàáÃáàôáàáúúøáàáàúúáàáàúúúáàáÅúúúáàáÃúúøáàáÅúúøáà
Åúúúáàáàúúú°°°úúúáàô°°Þúúáàáàáúúóáàáàúúê°°°úúáàáà°°°úúéáàá°°Þáàô°°Òúúóáàáàúú
ú°°°úúúáàô°°Þúúó°°°úúúúúøáàáàúúúáàáÃúúÏúúê";
3016 PRINT
#2,"°°°°ááê°°Þáàê°°Òáàê°Ò°° ááê°° °°Þ°°°°°ááê°ÞÒ°Ä°°Åúúú°°°°°°°°ááê°°
ááô°°°ááô°°°ááê°° °°°°° °°°ááêáàáàúúúáàáÅúúúáàáÃúúúáàáàúúóáàáàúúóúúðáàáàáàôáà
áàáàôáàáÜúúúáàáÅúúúáàáàúúúúúøáàáÅáàô°°°ááê°°á";
3018 PRINT
#2,"°°°°..–úúú°°ááê°° °°Þ°° °°Þúúú°°Òúúú°°Äáàê°°Òáàê°°°°Þáàô°°°ááêáàáàúú
óáàÃáàôáàáàáàôáàáàáàêúúú°°°úúôúúÏáàáàáàêáàÃáàêáàÅáàû°°°ááàáàáñòáàáàúúó°°°ú
úéáàá°°°úúûáàÅáàôáàáàáàáàáàáàáàáàáàúúó°°°úú";
3020 PRINT
#2,"á°°°úúé°°°úúé°°Þúúóáàá°°°úúó°°°úúó°°°úúó°°°úúóáàáàúúéáàáÃáàôáàáàáàÜáàá°
°°úúôáàáàúúáàáàúúóáàáàúúóáàáàô°°°ááàáàô°°°ááÅáàêúúú°°°úúéáàÃáàûáàáàô°°°á
 áàáàôúóó.Ÿ¤°°Þúúú°°°ááê°°°ááÅáàØáàôáàáàá";
3022 PRINT
#2,"ôáàÅáàûáàáàáàô°°ÒáàáàáàáàáàØáàô°°Þ.. ááê°°Þúúé°°°úúúáàê°°°ááàáàûáàØ°°á
áúáàáàáàôáàáàáàôáàá¼ôÒúúóª ò°æª ò°í¼ôÒáàá¼ôÒÕúúúª èÃª èŸæª è Ó¼è–úúúª è ï ª è»
ïñè»áúúú°°°ááàƒÉª è»ïñè»áàáàúúôáàáé°°°ñíéß";
3024 PRINT
#2,"úúøúúéúúø°°°úúê..–úúú°°Þúúú°°°ááê°°°.. úúúáàÃáàêáàáàúúúáàÅáàêáàáàÅáàêáàá
àáàÜáàéáàØúúúáàáàáàØúúú°°°úúó°°°úúé°°°úúó°°°úúú°°Þúúóáàá. úúú°°°úúóáàáàúú
óáàÅáàôáàáàáàêáàáàØáàáàáàØáàáàûúúúúúøáàá°°°";
```

```
3026 PRINT
#2,"úúé···úúó··Þäää··Þúúéäää···..–úúú··Þúúóää Åúúóää Åääûääàúúú···úúó··Þúú
ó··Þúúá···ääû···ääéääääää·· ··Þúúûääà···ääð···ääð·· ääéääääää û··Ôúúó··øää
 àääð··Þäää··Þúúúääé··Ôúúé··Ôääé··Þääéää Å";
3028 PRINT
#2,"ääðääääääðääääääðääääää·· ···ääð··Þúóú···úúú··Þääð··Ôúúóääà···úúéääá··
·ääØääéääääääðääääääû···ääääääéää Åääéää Ðääéääá Åúúïúúóääàúúúúúøääääää û···ääéúú
 øääàúúóää ÅúúóääääéøääúúúääÅääðääääääûääà";
3030 PRINT
#2,"ääð···ääääää···ääð···ä»Dƒañèdòúúé···úúéääð··ÞääÜƒÉ·è»ô·íÅðñíåðúúøúú
á..ðúúúääû···ää Åääð···ääääääðääÅääð··Ôƒa¼è íääà·èDÔ¼èÔúúúñé Ôúúó···ääéää
 àƒÉñíÜæúúúääàúúéääû···ñíÜ.úúûääàúúóääÅ··";
3032 PRINT
#2,"·úúóääÄ··Þúúó··Þúúó···ääð·· ääääøƒañèÜíääà···úúú··Þ.. úúúääðääøääÄƒ
Éñíéúúóää Åääéúúääääàúúé·· ääð···ƒa·èÜ«·è ·íûÜ·è«ð·è«Ö·èÜ±ƒÉ¼í íúúúƒa¼èÜ
 àúúéƒÉ·èDÔƒa¼è«ääàƒÉ¼íÜÅúúóñí áúúóääÅúú";
3034 PRINT
#2,"ú··Þúúú··ääàääääääàääøƒa¼è·ääà·íÖ·íäð·íäéƒÉ·í·ëƒa·èð»ƒÉ·íòdñíäšúúúää
àúúéääàúúú.. úúó···úúð···úúéääàúúú···úúúääû···ääéääääää·· ··Þúúé···úúä
ääÅ··Ôúúó..–··Þúúó···úúúääð··Þúúé···úúú·";
3036 PRINT
#2,"····ääû···ääû···ääääädääääŸääääðääøääéúúúääääÜääéääø·í·åƒa·èÖ«·è
ùñè· úúá··Þääø¼èäðúúú·íð ƒÉ·í Ö·í·ðñíð·ääÄúúúääé··Þúúéääàúúé···úúó···úú
úääû···..–úúéääàúúéääà···úúú··Ôúúóää Å··Þ";
3038 PRINT
#2,"úúéääð···ääð··Þääé··Þúúó···úúóääûääøääéääàääûääàääðääàääðääàääéääàää
ûääàääéääÄñí°±ääàúúúääà···äéêñè Þääàúúúääàúúóää Åúúúúóääà···ääé··d·····
 ääð·í °ñí°úúúääàúúéääÅúúá···úúó···úúääà";
3040 PRINT
#2,"Åääðää Üääðääàääéúúúääàúúó..»···úúóääà···úúóääàúúó···úúûääé··Þúúú··Ôú
úúääé···..–úúú···úúó..–ääðääøääéääàääðääàääðääàääé··Þúúé..–úúú···úúúääéä
 ääàéääÅääû···ääàääðääàääðääàääàääàääðää";
3042 PRINT
#2,"àääû···ääð···ñííÔääàúúó···úúð··Þúúú..Ÿääéääøääéääàääàääàääðääà·í±Ÿñí
·õúúú··Þúúóääàúúú···úúó···úúó.. úúú···úúóääá···ääàääð··ÞääÜääéääàääÜääÅ·
 íéøñíê úúúääÅ··Þƒa¼í±ääàƒÉ·í±í·åƒa·íê";
3044 PRINT
#2,"Æñí ûääÅúúúääé·í±«ƒÉñíèùääàúúøääàúúóääé··Ôääð···ƒañíê ääà···úúú·íí··
í± ƒÉñèéíääÅúúóääàúúû..–úúû···úúóääé··Þúúúúøúúó···úúó···úúé···úúá···ääé
 ···ääð···ääðääàääá···ääð··Þúúúääûääøääð·";
3046 PRINT
#2,"···ääéääàääûääøääàääÜääð···..–ääðääøääéääàƒa·íäè¼ííÄúúúƒÉ·í·Åƒañè Þúúú
ääà···úúú··Þúúúääéää Å·íÄüñí Þôääà···úúúñèÄ–úúúääÄúúú···ääé··Þúúó···ääé··
 ··èÔø·íÄøñíäšääà···úúúƒÉñíäŸúúú···ääà·íä";
3048 PRINT
#2," ƒa·èÅéƒÉ·èÞ»ƒañíÄéääàúúó···úúóääð···..–ääé·íÒïƒÉ·íÒ»ƒañèÉääàúúú···
ƒÉ·íàä·íÅäƒañèÅ úúúääÅääéääàúúú···úúúääé··Þ·èÞÜƒÉ·íäÆ·íÅƒa¼èóääÅ·íäóƒÉ
 ·íàóƒa¼èÄ±ääà¼èíääà·èÔèƒÉ·íäšƒa¼íÔéúúúñ";
3050 PRINT
#2,"í°Õúúó···úúéääûääà·í·°ñèääää···úúúñíÅääÅúúú···úúúääé···ƒÉ·íÅÒƒañíÄ
àúúú···ääàƒÉ·íàƒá·àÔƒÉ·Äú.·àû  ƒañàÔšúúúääà···úúú···ääàƒÉ¼ääää·ÅŸ·Å
 ñÄüõúúø··Þúúóääà····· ääÅƒañàæ ääÄ··Þúú";
```

```
3052 PRINT
#2,"óäää***äää****åæÎ½åæ»äää∫É*àú▪½àü▪ääà∫ä*àÓä∫É*àÓš∫ãñàÉäää***úúó**Þâ
äääåñäääàúúúäää∫ÉñÅüääàúúóäääàúúú**Þúúúäää***äääää*àü°∫ä*àæ ½àÖÖúúó*
 àÕ∫É*Åú**Äü°∫ä*Å.*∫É*à0∫ä*à£Ó*à∀∫ÉñÅó";
3054 PRINT
#2,"æúúéääð***ääà*Åó∫ãñÅ¤ÔääàúúúääÆ∫É*Ãðú∫ãñÃðääàúúúääÆ∫É*à0¤*à¤í*à¤»ƒ
å½à0áúúé∫É*à0▪ñà¤šääà***úúóäää***ääãñÅ– úúú***ääàñà¤Æúúúääà***úúóääð***ä
 ää∫ä*à¤ä∫Éñà–ðúúó**Þääåñà òääÅúúú***úúú*";
3056 PRINT
#2,"*Òäääääåñå¤ðúú¤úúóääð**Þ*àð**à¤ß*Å–Õñà0*ääà***úúó*à∀Å*Åí0½Åë–ääåñàé
úúéääÅääéúúúääà..–úúú..–úúú***ääé***äääääÅääÛäääääð***äääääà*àëä*àë▪*Äë▪
 *àëÅñàäßääàúúúääÆ∫ãñÅd–úúúääÃääéúúúääÃúú";
3058 PRINT
#2,"úääÃääéúúúääÃúúú***ääé**Þúúú**Òääé*ÞÞääé**Þúúú***ääé*ÞÒäÅÄ*Åá ½Åäéää
à½ÅäïääÞ*Å▪ïñÃäïääÞúúóääÅääðääÞúúú***úúóääð**Þúúó**Òääé**Òäääääð**Òúúúää
 é***..–∫É½àäšúúú*àÉä∫ä*à▪dñÅ▪äúúúääÃúúú*";
3060 PRINT
#2,"***ääé**Òúúú***ääé**ääÞ½Å▪ úúó½ÃäÃúúó∫É*Ãäš½àá«úúú∫ãñà Üääàúúú**Òääå
½à äääÄ∫É*à£Ð*à£*∫ãñÅd1ääàúúúäääéääÃúúúääð*ÒÄ∫É*àdä½àdääà*àd*½ašäääÄ∫
 ä*Å▪ÄñÃäÒääÃúúúääé**Þúúú**äää*½Å«óääÒ½Äû";
3062 PRINT #2,"ðääàÑóääää ¡ô  ÅÜ*ñô ±∫ãÉ"CHR$(15)"      PLANTAR
FASCIITIS"CHR$(10)CHR$(13)"  ("CHR$(34)"HEEL SPUR
SYNDROME"CHR$(34)")"CHR$(13)"ñ"CHR$(15);
3066 GOSUB 470
3071  GOSUB 325
3076  GOTO 3200
3200
VIDEOCMD$="E001@13592@15420@VW1@:1@@":VDCMD$="NORML":AUD$="FH":INDX$="
Q":GOSUB 600
3205 GOSUB 480
3210  GOSUB 355
3215  GOTO 3400
3400 PRINT
#2,CHR$(14)">@<@@@>D<GG@>H<xG@>L<"CHR$(127)"@@>P<IIH>T<rRp>X<dd'>\<"CH
R$(127)CHR$(127)"x>'<mmh>d<[[X>h<1IH>1<SZP>p<T@P>t<RRP>x<vvp>|<HA@>x|"
CHR$ (12)" AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13);
3402 PRINT
#2,CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR
$(10)"                L E G
"CHR$(13)CHR$(10)CHR$(14)CHR$ (14)"8@@@["CHR$(127)CHR$(127);
3406 GOSUB 470
3411  TMVL= 5 :GOSUB 310
3416  GOTO 3600
3600
VIDEOCMD$="E001@15422@18516@VW1@:1@@":VDCMD$="NORML":AUD$="FH":INDX$="
Q":GOSUB 600
3605 GOSUB 480
3610  GOSUB 355
3615  GOTO 3800
3800 PRINT
#2,CHR$(14)">@<@@@>D<GG@>H<xG@>L<"CHR$(127)"@@>P<IIH>T<rRp>X<dd'>\<"CH
R$(127)CHR$(127)"x>'<mmh>d<[[X>h<1IH>1<SZP>p<T@P>t<RRP>x<vvp>|<HA@>x|"
CHR$ (12)" AO"CHR$(34)"@'8@@^[~T$SA@"CHR$(15)CHR$(13);
```

```
3802 PRINT
#2,CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(10)CHR$(
10)"                K N E E
"CHR$(13)CHR$(10)CHR$(14)CHR$ (14)"8@@@["CHR$(127)CHR$(127);
3806 GOSUB 470
3811  TMVL= 5 :GOSUB 310
3816  GOTO 4000
4000
VIDEOCMD$="E001@18517@19642@VW1@:1@@":VDCMD$="NORML":AUD$="FH":INDX$="Q"
:GOSUB 600
4005 GOSUB 480
4010  GOSUB 355
4015  GOTO 62000
62000 REM This is where the module exit processing will take place
62010 GOSUB 470:PRINT
#2,CHR$(14)">x|"CHR$(12)"!H@@[2ZwLeZV!H@@@#@#@"CHR$(27)"L"CHR$(34)"@@"
CHR$(27)"I8@TmZYQ"CHR$(14)">|x#@3@JuZdV>x|"CHR$(27)"L"CHR$(34)" @'";
62020 PRINT #2,CHR$(34)"@@"CHR$(27)"I$JrW"CHR$(15)CHR$(13)CHR$(10);
62022 PRINT #2,"Do you want to review this module?";
62024 PRINT #2,CHR$(13)CHR$(10)CHR$(13)CHR$(10)"
(Y/N)"CHR$(14);
62030 PRINT
#2,">x|$BOr"CHR$(27)CHR$(76)CHR$(15)TIT1$CHR$(14)"8@@@["CHR$(127)CHR$(
127)CHR$(34)"@'";
62050 A$=INKEY$:IF A$<>"Y" AND A$<>"N" AND A$<>"y" AND A$<>"n" THEN
62050
62060 IF A$="Y" OR A$="y" THEN 2000
62100 GOSUB 810:COM (1) OFF:IF REVW$="REVIEWMODE" THEN 62200
62110 IF NXTMOD$="SYSTEM" THEN 62200
62120 RUN DRIVMO$+":"+DIRCTMO$+NXTMOD$
62200 SYSTEM
64000 REM This is where the cursor positioning takes place
64010 RETURN
65000 WHILE NOT EOF(2)
65010 A$="":A$=INPUT$(LOC(2),#2)
65020 IF RIGHT$(A$,1)=CHR$(19) THEN 65100
65025 IF A$=CHR$(19) THEN 65100
65030 IF RIGHT$(A$,1)=CHR$(17) THEN RETURN
65035 IF A$=CHR$(17) THEN RETURN
65040 WEND:RETURN
65100 COM(1) OFF:WHILE NOT EOF(2)
65110 A$=INPUT$(LOC(2),#2):IF A$=CHR$(17) THEN COM(1) ON:RETURN
65120 WEND:GOTO 65100
```

Appendix F

Additional Forms

page1	T	text Welcome	
START	T	graphic STARTING OUT	
page2	T	text Starting Out intro	
page10	T	text POSTURE title page	
POSTURE	V	video running posture	video1
JAMES	T	graphic over video	
FTPLANT	V	video foot plant	video1
page11	T	text SCHEDULE title page	
MISSING	V	video missing days	video2
DISTANCE	V	video distance	video2
page4	T	text beginner schedule	
page5	T	phase 2 schedule	
page6	T	phase 3 schedule	
page7	T	phase 4 schedule	
page8	T	phase 5 schedule	
page12	T	text BOREDOM title page	
BOREDOM	V	video boredom	video3
page13	T	text REFINEMENTS title page	
REFINE	V	video refinements	video4
INJUR	T	graphic INJURIES	
page9	T	text Injuries intro	
page14	T	text FOOT title page	
page15	T	text PAGLIANO titile page	
INTRO2	V	video foot injuries	video6
RUN8A	T	digitized graphic plantar fascia	
FOOT	V	video foot injuries	
page16	T	text LEG title page	
LEG	V	video leg injuries	video6
page17	T	text KNEE title page	
KNEE	V	video knee injuries	video6
FOOTREM	V	foot plant	video5
DISTREM	V	distance	video5
ARMREM	V	arm posture	video5
BOREREM	V	boredom	video5
FASTREM	V	fast running	video5
IMPREM	V	improvements	video5
STOPREM	V	stopping	video5
WTREM	V	weight	video5
PRONEM	V	pronation	video7
EQUIREM	V	equinus	video7
HYDREM	V	hydrotherapy	video7
ACHREM	V	achilles tendon	video7
MESOREM	V	mesotendon	video7
SHINREM	V	shin splints	video7
KNEEREM	V	knee	video7

Video Page Creation

Disk # 2

Choose V - Video Scene Information

Choose 1 - Prepare videodisc scenes

- Filename

Choose 1 - Define scene information

Scene name:
Start frame:
End frame:
Control command: fplay
Audio channels: both
Display frame index: no

Graphic Title Over Video

```
fd
b:
fl
colormap
cb
mx
ll
return (background)
.c
TE
JAMES FIXX
wt
6.3
.c
fs
filename: JAMES
qu
```

* NOTE: In module definition video page must proceed the telidon page

INJURIES Graphic

```
fd
b:
fl
colormap
cb
mx
14
15 (background)
return
.c
TM
TE
INJURIES
mx
13
return
TE
hit 1 to position cursor
move 1 space diagonally
return
retype INJURIES
fs
filename: INJUR
qu
```

Module Logic Definition

Disk # 1

Choose M - Module logic definition from pre-defined information

Choose No to create a new file

Domain 1 Module 3

Page#	Pg. Type	Pg. Name	Q	Source	Pg. Wt.	Pg. T.	Next Pg.
1	T	page12	N	T	T	05	2
2	V	BOREDOM	N	V	W		0

Filename: BOREDOM

Module Assembly

Introductory Module	(Y/N)	:
Review Module	(Y/N)	:
Domain Number	(1-19)	:
Module Number	(1-19)	:
Last Module	(Y/N)	:
Sensitive Areas	(Y/N)	:
Video Tape or Disc	(Y/N)	:
Module Control Device	(C/K)	:
Video Source	(D/T)	:
Input Disk Drive		:
Output Disk Drive		:
COURSEWRITER Programs Drive		:

Input videodisc filename:

Input description filename:

Question Parameter Entry

Question #	Type	Type/Number	Question Points	Review Page

Filename:

Domain:

Test Question Definition

Disk # 3

Choose T - Test logic definition

No to create a test

Number of questions the student must answer:

Number of compulsory questions :

Total number of questions :

Passing percentage for the test :

Test Question Assembly

Domain:

TF Drive :

MC Drive :

FB Drive :

SA Drive :

Test Description Drive:

Output Drive :

Filename :

Review Module Assembly

Choose A - Assemble a module to executable form

Introductory Module	(Y/N)	:
Review Module	(Y/N)	:
Domain Number	(1-19)	:
Module Number	(1-19)	:
Last Module	(Y/N)	:
Sensitive Areas	(Y/N)	:
Video Tape or Disc	(Y/N)	:
Module Control Device	(C/K)	:
Video Source	(D/T)	:
Input Disk Drive		:
Output Disk Drive		:
COURSEWRITER Programs Drive		:

Input test description file	:
Input disc file	:
Input description file	: